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INSTITUTE FOR DEFENSE ANALYSES

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PREFACE

The Institute for Defense Analyses (IDA) performed this study under tasking from the Office of the Deputy Under Secretary of Defense for Logistics and Materiel Readiness (L&MR). This report represents the teamwork of IDA and three consulting firms with recognized expertise in the commercial airline industry: Eclat Consulting, GRA, and Morten Beyer & Agnew. Each member of the team focused on selected topics and documented the results of its work in the appendices to this report.

The study team worked under the guidance of a senior inter-agency steering group representing the Department of Defense, the Department of Transportation, and industry (through the National Defense Transportation Association). Members of that group included:

- Ms. Diane K. Morales, DUSD(L&MR), Task Sponsor
- Mr. Earl B. Boyanton, Jr., ADUSD(Transportation Policy)
- Mr. Jeffrey Shane, Associate Deputy Secretary, DOT
- Mr. Patrick Murphy, Chairman, NDTA Military Airlift Committee and Principal, Gerchick & Murphy
- MGEN Cella Adolphi, USAR, JS (J-4)
- RADM Christopher Ames, USN, USTRANSCOM (J-5)
- Mr. Ken Stombaugh, Deputy, ADUSD(TP)

Experts from industry and the government made important contributions in three conferences organized for the study. In the first conference (August 2002), airline industry and airline association representatives presented their views on the state of the airline industry and the CRAF program. The second conference (October 2002) addressed demand-side considerations and enabled DoD representatives to present and discuss the results of MRS-05, subsequent developments that affect the demand for airlift, and planned transformation initiatives. In the third conference (November 2002), the study team presented its tentative findings.

This manuscript was reviewed by Michael Leonard and Stan Horowitz. Burnette (Bernie) Aylor assisted in organizing the conferences and preparing the manuscript. Eileen Doherty provided attentive editorial assistance.

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SUMMARY

The Civil Reserve Air Fleet (CRAF) program represents a longstanding partnership between the Department of Defense and the U.S. aviation industry. CRAF airlines have provided essential support to the U.S. military since the Korean War. When CRAF was activated for the Persian Gulf War, two-thirds of the troops and one-quarter of the air cargo went by commercial air. Today, the CRAF airlines are supporting Operation Iraqi Freedom, and are committing nearly double the amount of commercial aircraft required by DoD for its most demanding war plans.

In the coming years, DoD's management and employment of CRAF will need to adapt to meet a number of significant challenges. But, if DoD takes appropriate steps, it can continue to rely on adequate support from U.S. airlines for its military operations through the remainder of this decade, and beyond.

On the supply side, the airlines will continue to own and control far more than enough long-haul aircraft to meet DoD's requirements, despite the economic turmoil in the industry. Economic factors such as the dot-com recession, the September 11th terrorist attacks, the rise of the low-cost airlines, and globalization have inflicted unprecedented financial losses on the major airlines. As these airlines are restructured – whether through bankruptcy or internal management initiatives – routes will be consolidated and the inventories of the largest passenger aircraft will shrink. The fleets of modern two-engine wide-bodied passenger aircraft are nevertheless expected to increase by more than 40 percent by the end of this decade. The cargo sector will see continuing growth, expanding fleets of the largest wide-bodied aircraft, and increasing dominance of the integrated cargo carriers, such as FedEx and UPS.

On the demand side, developments in the global security environment, as well as DoD's aircraft purchases and transformational initiatives, will reshape DoD's employment of CRAF. The proliferation of weapons of mass destruction and global terrorism will increase security concerns and may lead DoD to establish intermediate staging bases (ISBs) to keep most logistics operations outside of an immediate combat zone. Better planning and preparation could permit DoD to better employ CRAF airline capabilities in support of a more agile and streamlined logistics system.

DoD's plans and programs for acquiring additional military aircraft assume continued reliance on CRAF for passengers and aero-medical evacuation. For cargo, the program to expand the C-17 fleet from 120 to 180 aircraft will reduce – but not eliminate – the need for wartime augmentation. Even with a much larger fleet of C-17s, such as TRANSCOM's proposed fleet of 222 C-17s, CRAF augmentation would be needed for the most demanding contingencies.

In view of these anticipated developments, this report describes four broad initiatives for managing and employing CRAF over the next decade.

Improved operational planning for employing CRAF

DoD's war plans and exercises should examine future airlift operational concepts that enhance the effectiveness of CRAF. A limited informal survey of CRAF participants finds they are supportive of DoD's engagement with the industry in planning and operations supporting Operation Enduring Freedom and Operation Iraqi Freedom. CRAF participants support an ongoing DoD-industry CRAF planning group to strengthen future plans and operations.

Robust and efficient incentives for CRAF participation

CRAF is a *quid-pro-quo* agreement through which airlines commit their aircraft to support military operations, and in return are given access to serve government markets with over $2 billion per year in revenue. About 40 percent of this government revenue is from DoD's passenger and cargo charter business, which is allocated to CRAF participants through a mobilization value point system that awards peacetime business to competing teams roughly in proportion to their share of committed CRAF capacity. The remaining 60 percent of this government revenue is from the GSA City Pairs passenger market and express cargo market, which require a minimum commitment of 30 percent of a participant's long-haul fleet.

The study team developed a CRAF Incentives Model to assess alternative incentive structures. We find that both the mobilization value point system and the minimum commitments are essential incentives for sustaining CRAF participation under the current system. In the near-term, this system will remain viable; however, the Model predicts that within the next two to five years, the expected reductions in the peacetime cargo business base and improvements in the U.S. economy will undermine incentives to the point where participation will fall below needed levels. DoD should begin consultations with the airlines on alternative incentive systems that promise greater efficiency, equity, and robustness. Some alternatives are discussed in the report.

A DoD risk-management framework to assess proposed changes in international regulatory regimes

Current U.S. law and practice place a strict 25 percent limit on the foreign share of ownership and control for U.S. registered airlines. The government is likely to receive requests to negotiate liberalization of this provision in the next several years.

DoD should create a strategy for addressing such proposals. To support this, the report outlines a risk management framework focused on ensuring the CRAF program provides an ample supply of reliable commitments from participating airlines. Two key risk management provisions are discussed:

- Eligibility criteria that ensure participating airlines can reliably meet their CRAF commitments, independent of their ownership.
- Criteria for national security reviews of individual airline applications to increase foreign ownership shares beyond the current 25 percent ceiling. Such reviews could be done under the authority of current airline fitness reviews, or under the authority of the Committee on Foreign Investment in the United States.

If strong risk-management safeguards were adopted, DoD could effectively manage the CRAF program to meet national security requirements, even if the U.S. government were to raise the current ceiling on foreign ownership and control.

A DoD airlift program that balances military and commercial capabilities

Over the coming decade, there will be significant changes in the commercial aviation industry as well as in DoD's logistics concepts and requirements for airlift. DoD will, for example, increasingly rely on intermediate staging bases at the periphery of combat zones and it will introduce the Army's Stryker Brigades and Future Combat Systems. It would be prudent for DoD to re-assess airlift requirements and alternatives before a decision is made to continue expanding the C-17 fleet beyond the current programmed delivery of 180 aircraft in 2008.

DoD's "Flying Hours" program assumes that 60 percent of DoD's peacetime transport aircraft training operations is funded by revenue-generating cargo operations. This assumption will need to be revisited: by 2006, the C-17 fleet will reach a capacity (about 125 aircraft) that will begin to exceed DoD's historical peacetime demands for cargo transport. Once this threshold is crossed, it will not be possible to fund additional operations with revenue from additional peacetime cargo.

I. INTRODUCTION

The Civil Reserve Air Fleet (CRAF) program celebrated its fiftieth anniversary in 2002. It has proven to be an effective collaboration between the government and the U.S. aviation industry. This report identifies several airline industry and national security developments that need to be addressed in shaping the future of the program, and describes initiatives for sustaining the program over the remainder of this decade. We begin with a brief description of the CRAF program, highlights of the concerns that motivated this study, and the organization of this report.

A. THE CRAF PROGRAM [1]

CRAF entails a *quid-pro-quo* agreement between the government and industry: air carriers that commit to provide aircraft in support military operations are given eligibility to serve peacetime government business – a market totaling $2 billion annually. The program is based on voluntary agreements between the Department of Defense and the airlines. The U.S. Transportation Command (TRANSCOM), which is assigned the mission of providing "…air, land and sea transportation for the Department of Defense both in time of peace and time of war" administers the program through the Air Mobility Command (AMC).

CRAF provides DoD with access to a large reserve of commercial airlift capacity, including crews, en route infrastructure, fuel, maintenance, and ground support equipment that is capable of moving military forces and cargo within 24-48 hours after notification of a call-up of aircraft. In order to take part in the program, CRAF participants must use U.S.-registered aircraft, maintain crews (U.S. citizens only, no reservists), and commit a specified set of aircraft. The current participants in the program are identified in Table 1. About 250 cargo aircraft are committed currently; this represents 86 percent of the long-haul cargo fleets of the participating carriers. The 479 committed long-haul passenger aircraft represent about 70 percent of the participants' long-haul passenger aircraft. These commitments are about double DoD's current planning targets for both commercial passenger and cargo aircraft. (These are expressed in "wide body equivalents" as shown in the table.)

[1] Appendix A covers the history and description of the CRAF program. The program operates under the National Airlift Policy, which stipulates that DoD will employ commercial aviation to augment available military aircraft in support of national security needs. (National Decision Directive 280, 1987.)

Table 1. CRAF Participants

Airline	Number of Long-Range Aircraft Committed	Pct of Airline's Long-Range Fleet Committed
CRAF Cargo Aircraft **CRAF Target: 120 Wide-Body Equivalent Aircraft (WBE)*** **Total Pledge of 252 Aircraft = 221 WBE**		
Airborne Express	3	25
Atlas Air	32	100
Federal Express	111	100
Gemini Air Cargo	16	100
Northwest	12	100
Omni Air International	2	100
Polar Air Cargo	16	100
DHL Corp.	7	100
Evergreen	10	100
Southern Air	4	100
United Parcel Service	11	25
World	5	100
Air Transport International	13	100
Arrow Air	10	100
Total Cargo Aircraft Committed	**252**	**Average percentage: 86%**
CRAF Passenger & Aero-medical Aircraft **CRAF Target: 161 Wide-Body Equivalent Aircraft (WBE)*** **Total Pledge of 479 Aircraft = 304 WBE**		
American Trans Air	37	100
Northwest	55	93
Omni Air International	5	100
American	100	65
Continental	80	90
Delta	72	49
North American	3	100
United	96	60
USAirways	20	100
World	7	100
Hawaiian	4	33
Total Passenger & Aero-medical Aircraft Committed	**479**	**Average percentage: 69%**

* A Wide-Body Equivalent (WBE) is based on the capacity of a B747-100 aircraft.

The authorities for activating the aircraft committed to the CRAF are phased into three stages:

- Stage I – Committed Expansion. This stage is activated by the Commander, TRANSCOM, with the approval of the SECDEF (30 passenger wide-body equivalents (WBE), 30 cargo WBE[2]).
- Stage II – Defense Airlift Emergency. This stage and is activated by the Commander, TRANSCOM, with the approval of the SECDEF (an additional 57 passenger WBE and 45 cargo WBE); its purpose is to respond to major regional combat operations
- Stage III – National Emergency. This stage is activated by the Commander, TRANSCOM, based on the order of the SECDEF (49 additional passenger WBE, 45 additional cargo WBE); its purpose is to respond to a national emergency declared by the President or the Congress.

The U.S. airlines have provided major support for military operations ranging from Korea to the present.[3] The CRAF call-up of Stage I and Stage II (partial) in the Persian Gulf War demonstrated the viability and value of the program (it also revealed a number of flaws that were subsequently addressed). Commercial air carriers deployed 67 percent of all troops and 25 percent of all air cargo to the Gulf. Following the conflict, they redeployed 85 percent of the troops and 42 percent of all air cargo.[4] CRAF was activated again for Operation Iraqi Freedom, and an informal poll of CRAF participants indicates that the program is working well.[5]

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[2] In the CRAF program, a wide-body equivalent aircraft is defined as the capacity of a B-747-100 aircraft.

[3] During the Korean War, commercial airlines carried 67 percent of the passengers, 50 percent of the air cargo, and 70 percent of the mail over the air-bridge from the U.S. to Japan. Over a ten-year period of U.S. engagement in Vietnam, CRAF airlines carried more the 11 million passengers and 1.3 million tons of cargo. See: LtCol. Cheryl Mach, *Asymmetric Warfare—Can the Civil Reserve Airfleet Meet the Challenge?* U.S. Army War College, Carlisle Barracks, Pa., 2001; Ronald N. Priddy, *U.S. Civil Aviation's Contribution to Improved Air Mobility.: Air Mobility Symposium: 1947 to the Twenty-First Century*, U.S. Government Printing Office, 1998; and Congressional Budget Office, *Moving U.S. Forces: Options for Strategic Mobility*, U.S. Government Printing Office, 1997.

[4] James K Matthews and Cora J. Holt, *So Many, So Much, So Far: United States Transportation Command and Strategic Deployment for Operation Desert Shield/Desert Storm*, Joint History Office of the Joint Chiefs of Staff and Research Center, USTRANSCOM, 1996. Roger K. Coffey and F. Ronald Frola, *The Civil Reserve Air Fleet: Trends and Selected Issues*, Logistics Management Institute, McLean, Virginia, IR505MRI, May 1996, p2-3.

[5] IDA surveyed selected CRAF participants and the National Air Carrier Association by phone and email in April, 2003.

B. CONCERNS THAT LED TO THIS STUDY

CRAF augmentation of military airlift will remain an essential resource for U.S. national security, but there is concern that the program may not be sustainable in the face of likely developments in the aviation industry and in the global security environment. The Office of the Secretary of Defense (OSD) commissioned this study to identify the critical developments that will shape the program over the remainder of this decade, assess the program's continued effectiveness, and identify actions needed to preserve DoD's access to commercial airlift assets.

On the supply side, this study evaluated several factors that will shape the industry over the next decade:

- The passenger airline industry will undergo major restructuring in response to financial losses and the rise of low-cost airlines.
- Integrated cargo carriers, such as FedEx and UPS, will increasingly dominate cargo markets.
- Globalization is reshaping international networks, and creating pressures for international regulatory regime changes.

On the demand side, we evaluated factors that will shape DoD's plans for using CRAF:

- DoD intends to increase C-17 military cargo fleet capacity significantly.
- Future airlift requirements will be driven by new war-fighting concepts, including new logistics approaches intended to reduce the theater logistics footprint through concepts such as intermediate staging bases and time-definite delivery.

This report examines each of these factors and the key issues that will need to be addressed to ensure the continued viability of the CRAF program. The structure is as follows:

- Chapters II and III review the forces that will shape CRAF over the coming decade.
- Chapters IV and V describe the four broad initiatives needed for managing and employing CRAF.

The appendices report the substantive assessments forming the basis for this report.

II. COMMERCIAL AVIATION DEVELOPMENTS

DoD's ability to rely on commercial airlift augmentation is predicated on the available supply of adequate numbers of long-range aircraft capable of handling DoD passengers and cargo. Three major forces will shape inventories of aircraft over the remainder of this decade.

A. PASSENGER AIRLINE RESTRUCTURING

The airline industry today is experiencing unprecedented financial losses. Including the $5 billion paid by the U.S. government for the near-term losses following September 11th, U.S. airlines will have lost $20.7 billion in just two years (2001 and 2002).[6] Loses of $10 billion or more are expected in 2003, as well.

The passenger segment of the market has been hardest hit. In the late 1990s, business travel was buoyed by the dot-com economic bubble, which yielded a period of unprecedented average fares and profitability for the major airlines. When the dot-com bubble burst, the business travel market imploded. Growth in total traffic began to slow in 2000, and traffic began to shrink in domestic markets in early 2001. The second blow came from the terrorist attacks of September 11th, 2001, which cut traffic by over 30 percent. Traffic has recovered, but throughout 2002 both domestic and international traffic remained about 10 percent below their pre-September 11th levels.

Compounding the effects of the recession, the continuing growth of the low-cost airlines has placed increasing pressure on the major airlines to reduce fares to remain competitive. Airlines such as Southwest and JetBlue rely on cost minimization and low fares as the central feature in their business model. Originally, these carriers focused on expanding their share of the low end of the market – the short haul, discretionary passengers who were traveling by surface or not traveling at all. That model is now successfully applied in longer distance markets and even coast-to-coast service, and is attracting an ever-increasing share of the network carriers' customer base.

Assisted by the internet marketing of airline seats, the share of domestic passenger traffic for low-fare carriers grew steadily for a number of years, and jumped by almost 5 percentage points in the last two years, to slightly more than 22 percent. Fred

[6] The Air Transport Association recently announced that it estimates 2002 losses at $8 billion; 2001 losses were $7.7 billion excluding the $5 billion government payment. The previous next-worst period was 1990-1994 when a recession, the Gulf War, and a major fare war followed in rapid succession. In those 4 years U.S. carriers lost about $13 billion.

Reid, President of Delta Air Lines, recently said that he "…expects low-cost carriers to double their market share to 40 percent in the not too distant future."[7]

Figure 1 illustrates the combined effect of the competitive pressures from low-cost carriers, the dot-com recession, and September 11th. In 2000, the major airlines' average revenue peaked at over 12 cents per available seat mile. After being hit by these three forces, average revenues dropped to about 9.3 cents per available seat mile – more than 20 percent. As a result, the major airlines' passenger revenues fell by $6 billion in the first quarter of 2002, relative to their peak in the first quarter of 2000. Average revenues have recovered modestly since then, but still remain significantly below the peak.

The comparison in Figure 1 of the trends in average cost per passenger seat mile for the major airlines and the low-cost airlines demonstrates the enormous competitive challenge facing the network carriers in the markets served by the low-cost airlines. A gap of about 2 cents per seat mile – about 20 percent – persisted in the mid 1990s. But this gap has actually grown significantly in recent years, and may now be as high as 30 percent. Network carriers are caught in a dilemma: they must adjust pricing to remain competitive, but their cost structures do not permit them to make a profit at the rates charged by the low cost carriers.

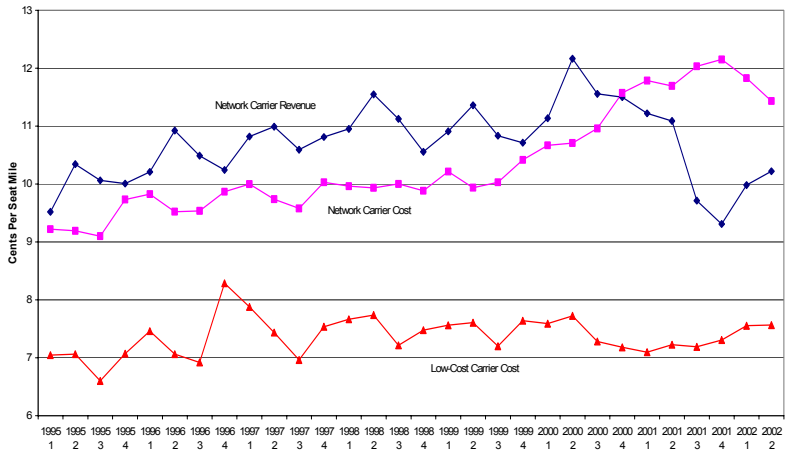


Figure 1. Costs and Revenues: U.S. Network Carriers and Low Cost Carriers 1995 – 2002 (Form 41 Data)

[7] "Consolidation is Wave of Future for Airline Industry, Delta President Predicts," *Knight Ridder/Tribune Business News*, September 19, 2002. In April, 2003, JetBlue announced that it would purchase 65 new A320 aircraft from European plane-maker Airbus, with an option for 50 more aircraft. The order gives JetBlue the ability to triple the size of its Airbus-only fleet within 10 years. See, Julie MacIntosh (Reuters), April 24, 2003.

The major airlines' losses will present a financial drag on their investment programs well into the future because the airlines have been forced to borrow heavily to sustain their operations. Airline debt has increased by about $25 billion, from about $50 billion in 1999 to about $75 billion in 2002. Among the major passenger airlines, only Southwest has a top credit rating; the others have seen their credit ratings slip from one to eight levels.[8] Two major airlines, United and USAirways, have declared bankruptcy. American Airlines has threatened bankruptcy, and other major airlines could follow. Whether these carriers will emerge from bankruptcy, and in what form, is unknown. Regardless of who retains or gains ownership control of these airlines' assets during the bankruptcy proceedings, the outcome of the resulting restructuring can be assumed to result in significant reductions in the surviving operations and aircraft fleets.

B. GROWTH OF THE INTEGRATED CARGO AIRLINES

The recession and September 11th also adversely affected total cargo traffic, but the relative impact was modest when compared with the passenger sector. Moreover, the all-cargo market is recovering faster than the passenger markets. In part, this is because security restrictions have limited cargo carried on passenger airlines, thus shifting freight and mail traffic and revenues to the all-cargo carriers.

The impact of the recession and September 11th has been more adverse for the traditional all-cargo airlines than it has been on the integrated cargo airlines such as FedEx and UPS. The all-cargo companies were heavily engaged in high-value transpacific traffic, which has been hit by the recession. Even before this, they were losing market share to Asian-based cargo carriers, as well as to the U.S. integrated cargo carriers. These developments have made the all-cargo charter operators increasingly dependent on DoD business. As will be discussed in Chapter IV, this growing dependence on DoD has significant repercussions for DoD's management of CRAF.

C. GLOBALIZATION

Globalization represents a third set of forces that could figure significantly in shaping the future of the CRAF program over the next decade. Growth in airline alliances and code-sharing agreements are significantly reshaping airline operations. Code sharing enables one carrier to place its two-letter carrier code on the flight of another carrier, and hold out this service as its own. It has permitted the major U.S. air carriers to expand their

[8] At this time of this report, the following airlines were rated BB or below: Alaska, American, America West, ATA, Continental, Delta, Northwest, United, and USAirways.

networks and realign their route structures, both in small domestic markets through arrangements with regional airlines, and in international markets through arrangements with foreign carriers.

Code sharing initially was used in short-haul markets in the 1980s and 1990s, allowing regional airlines to be integrated into the network carriers' hub and spoke networks. In the 1990s, code sharing provided a means to build international networks and global marketing alliances. These arrangements have permitted alliances to exploit the regional competitive advantages of their member airlines, as well as to overcome national regulatory barriers to the development of integrated global networks.

There are currently four major marketing alliance groups involving major U.S. airlines:

- Star Alliance with 17 members, headed in the U.S. by United Airlines
- Oneworld with 15 members, headed in the U.S. by American Airlines
- Sky Team with 13 member airlines, headed in the U.S. by Delta Airlines
- Northwest/KLM, which also includes Continental.

Closely coupled with the growth in international alliances is the liberalization of international regulations and aviation rights. The Northwest/KLM alliance, which was approved in early 1993, provided the model. As part of this alliance, carriers sought and received immunity from U.S. antitrust laws. In exchange for this immunity, the Netherlands entered into an "open-skies" bilateral treaty with the United States, liberalizing competition through such key provisions as open market entry, unrestricted capacity and schedules, freedom to add routes within and beyond the country, and "double-disapproval" pricing; i.e., an airline's proposed prices stand unless disapproved by both countries.

The U.S. Department of Transportation (DOT) and the Department of State (DOS) have applied the Northwest/KLM model in numerous subsequent treaties. Today, the U.S. is a party to 97 bilateral air service treaties, of which 56 are open-skies agreements. These account for the vast majority of traffic in the world. The only remaining major bilateral partners without full open skies are Japan, the United Kingdom, China, Mexico, Russia, and Brazil (Canada is very close to open skies).

On balance, international market liberalization and alliances have been good for U.S. airlines. International markets now account for one-quarter of U.S. airline traffic, as compared to just 14 percent in 1990.

The continuing trend toward market liberalization could require DoD to address some sensitive policy issues regarding foreign ownership rights, and government traffic set-asides that will directly affect the basic *quid-pro-quo* arrangements underwriting the CRAF program. The European Court of Justice recently declared illegal several of the provisions of the open-skies agreements in the bilateral treaties between the United States and several European Union (EU) member states. The EU may be authorized to negotiate a multilateral agreement to replace the existing treaties. In this context, the EU is likely to table the Transatlantic Common Aviation Area (TCAA) proposal that is being advanced by the Association of European Airlines. This proposal would go beyond the open-skies model, and would remove current national limitations on foreign ownership and control and "Fly America" provisions. We describe an approach for addressing these proposals in Chapter IV.

D. U.S. AIR CARRIER FLEETS AVAILABLE TO SUPPORT CRAF

The financial challenges facing the U.S. airlines have initiated restructuring that will continue over the next several years. The ability of any of the major airlines to weather their recent losses and cope with the emerging low-cost competition remains uncertain. Despite these competitive issues, long-term growth of the U.S. economy will provide a strong base of demand that will continue to fuel growth in the aviation industry. Figure 2 illustrates the expectations for the passenger market.

After absorbing sharp setbacks, the aviation market will resume growth, but on a trend line substantially below that forecast prior to September 11th. The Federal Aviation Administration forecasts that passenger demand for large U.S. carriers will increase by about 40 percent from FY 2004-2014. Cargo demand will increase by over 60 percent. Barring some major surprise, economic expansion will support expanded capacity of both the passenger and the cargo airlines.

1. Commercial passenger fleets

Since September 11th, the network carriers have accelerated the restructuring of their aircraft fleets. Continuing recent trends, the industry has reduced average passenger aircraft size across the board. In short-haul markets, regional jets are now serving markets formerly served by the mainstay two-engine jets – the DC-9s and B737s. In long-haul and international markets, U.S. carriers have moved aggressively to retire the largest three- and four-engine wide-body aircraft. In the previous two years, the fleet of B747 aircraft has been cut by about one-quarter (from 123 aircraft in 2000 to 92 aircraft in

2002). United Airlines, for example, recently announced the retirement of more than 20 of its B747 aircraft. The projected B747 passenger fleet will continue to be reduced, to about 75 aircraft by the end of the decade. Over this period, about two-thirds of the older three-engine wide-bodies also will be retired from passenger service, reducing the projected fleet to about 30 aircraft.

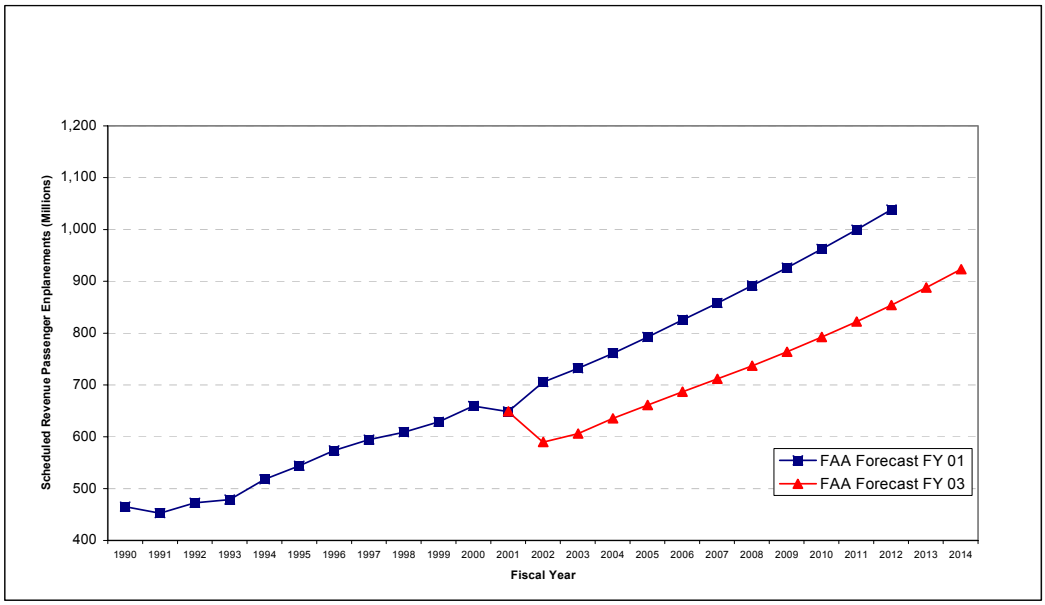


Figure 2. U.S. Passenger Demand: Actual and Projections, FY 1990 – 2014

The traditional model of consolidating international traffic at major hubs has over time given way to more decentralized, direct service route structures for long-haul international traffic. The effect has been to reduce the economic advantage away from the larger B747, DC-10, and L-1011 aircraft toward two-engine wide-body aircraft. In recent years, the airlines mainly have been acquiring two-engine, long-haul aircraft including B767, B777, and Airbus A330 aircraft. These aircraft have between 220 to 300 seats, versus the 400+ seats in B747 aircraft. The FAA forecast shows a continuation of this trend, with over a 40 percent expansion of this segment of the fleet by 2010 (see Table 2). The modern two-engine designs will account for 85 percent of the wide-body aircraft in U.S. passenger fleets (642 of 751 aircraft). DoD has begun to make use of these two-engine wide-body aircraft in the recent deployments for Operation Enduring Freedom and Operation Iraqi Freedom.

Table 2. Wide-Body Aircraft Fleets in 2002 and projected for 2010*

Wide-Body	Passenger		Cargo	
Aircraft Type	2002	2010	2002	2010
4 Engine	92	77	68	116
3 Engine	92	32	183	245
2 Engine	477	642	206	454
Total	661	751	457	815

* Note: The total U.S. passenger fleet in 2002 is 4913 aircraft and is projected to equal 7154 by 2010. The total 2002 U.S. cargo fleet is 1066 aircraft and is projected to equal 1362 by 2010.
Source: FAA

The study team's assessment is generally consistent with the FAA forecast, except that we expect an even more rapid retirement of B747 aircraft. It is possible that U.S. airlines will have only a few dozen B747 passenger aircraft in their fleets by 2010, mostly to serve transpacific routes.

The implications of these trends for CRAF are clear: the passenger sector will undergo restructuring that could significantly alter individual carriers' roles in CRAF, and DoD's management approach must be capable of adapting to this change. Overall, however, the U.S. aviation market will support a huge fleet of long-range passenger aircraft.

2. Commercial cargo fleets

The aggregate trends in the cargo segment indicate that wide-body aircraft fleets controlled by U.S. carriers will grow significantly. FedEx and UPS will probably account for a larger share of U.S. cargo capacity in 2010. Their continued expansion will help to drive the rapid growth in the number of two-engine (+120 percent) and three-engine (+33 percent) wide-body cargo aircraft. In addition, FedEx has a firm commitment to acquire ten A-380 freighter aircraft, which are larger than the B747 freighters. These aircraft, combined with expected conversions of retired passenger B747s to cargo use, are projected to increase the four-engine cargo fleet to 116 aircraft. In sum, the fleet of large cargo aircraft of relevance to CRAF is expected to continue to grow over the coming decade. At the same time, a huge fleet of two-engine wide-bodies also is emerging. This fleet is expected to more than double to well over 400 aircraft. corroboration

3. The potential effects of financial restructuring

A critical wild card in projecting the pool of U.S.-controlled aircraft available to CRAF is the possible effects of bankruptcy or other financial restructuring on the ownership and control of the fleets that will be serving U.S. markets. Industry restructuring will likely include additional aircraft retirements, aircraft sales, or perhaps financial agreements that bring aircraft under foreign control.

To gain some insight into the risks that these financially driven actions might pose to CRAF program commitments, we reviewed available Standard & Poor's and Moody's ratings and associated default studies of the airlines in CRAF. These ratings and default studies cover companies that operate over 90 percent of the aircraft in CRAF. The studies provide information on the probability of default within 12 months and within 60 months for each rated company.

To estimate the number of aircraft that might be subject to default proceedings, we multiplied these probabilities by the number of aircraft each carrier had committed to CRAF as of October 2002. These calculations suggest that a small percentage of the cargo fleet is at risk, on the order of three percent in the next year and eight percent over five years. These low numbers reflect the turnaround of the cargo market in 2002 and the very high credit ratings for UPS and FedEx, which dominate this category. For passenger aircraft, a higher percentage of the fleet is at risk, reflecting the poorer prospects that exist across the board for passenger airlines and the substantial debt burden they have assumed since September 11th. About seven percent of the fleet is at risk in the next year, and 18 percent over five years.

Of course, these numbers are only very rough indicators of the risk to CRAF. Airlines commonly continue operating through bankruptcy, and so bankruptcy does not necessarily equate to a loss of access to the airline's fleet. In addition, even a loss of the percentages of the fleet found to be at risk may be manageable given the current large over-commitment to the program. (Recall that Table 1 showed that current CRAF commitments for both passenger and cargo aircraft are nearly double the level required to support a Stage III call-up.) While these financial risks do not challenge the overall viability of the CRAF program, DoD needs to be prepared to adapt the CRAF program's management and incentive structure to cope with any significant industry restructuring.

III. DEMAND-SIDE FACTORS

Developments in the global security environment as well as DoD's strategies, plans, and programs, will shape the future demand for and management of CRAF. Three main areas are examined here. First among these are the factors that will drive both quantitative and qualitative changes in DoD's wartime demands for the use of CRAF. Second is the planned increase in DoD's military capacity and corresponding cuts in DoD's peacetime business base for CRAF airlines. Third is the role of cargo airlines in supporting supply-chain integration in the U.S. economy, which could represent critical competing demands constraining the desired use of CRAF.

A. RE-EXAMINING DOD WARTIME REQUIREMENTS

DoD's existing planning basis for employing CRAF builds on a series of studies that followed the Persian Gulf War. The most recent comprehensive analysis, the Mobility Requirements Study (MRS-05), was released in January 2001. It established DoD's mobility requirements for concurrently supporting two nearly simultaneous major regional wars and other high priority operational needs, given DoD's projected 2005 force structure. This approach was subsequently reviewed and reaffirmed as giving reasonable planning objectives during the Quadrennial Defense Review (QDR) of 2001.

Our assessments consider several factors that have changed since these reviews were performed. We build on the MRS-05 analytical methodology as a point of departure; the specific approach and techniques we employ to develop our estimates are explained in Appendix D. We summarize here our calculations examining the most important factors that will shape DoD's future mobility requirements and the need for CRAF augmentation. These include:

- The number of additional C-17 aircraft that will be procured (coupled with the projected retirement of C-141 aircraft and C-5 aircraft);
- The changing nature of the threat, which may drive the need to use intermediate staging bases;
- The scope and pace of the DoD transformation program and the ability to implement new force structure designs and joint operational concepts; and
- The ability to move oversize cargo on CRAF.

The calculations and resulting planning targets are described here.

1. Cargo requirements

Calculating DoD's future cargo requirements presents the greatest uncertainties because there are several planning parameters that are subject to future DoD decisions. We therefore have focused on establishing a "prudent" range of planning targets, and then consider upper- and lower-bound planning cases to examine how far the results might be driven by other possible, but less likely, scenarios.

a. MRS-05 baseline

The starting point for the cargo calculations are the MRS-05 baseline findings and assumptions (see Table 3). These may be summarized as follows: MRS-05 total cargo capacity requirements were set at 54.5 million ton miles per day (MTM/D). Of this, 6.2 MTM/D is for intra-theater and special mission requirements (these were assumed to be met by other aircraft, such as the C-130, or remained as unmet needs in the MRS-05 planning scenario). The remaining 48.3 MTM/D comprise the inter-theater lift requirement, which constitutes the planning target for "strategic" airlift. MRS-05 assumed that 27.8 MTM/D of this target would be provided by organic military aircraft and that 20.5 MTM/D would be provided by CRAF.

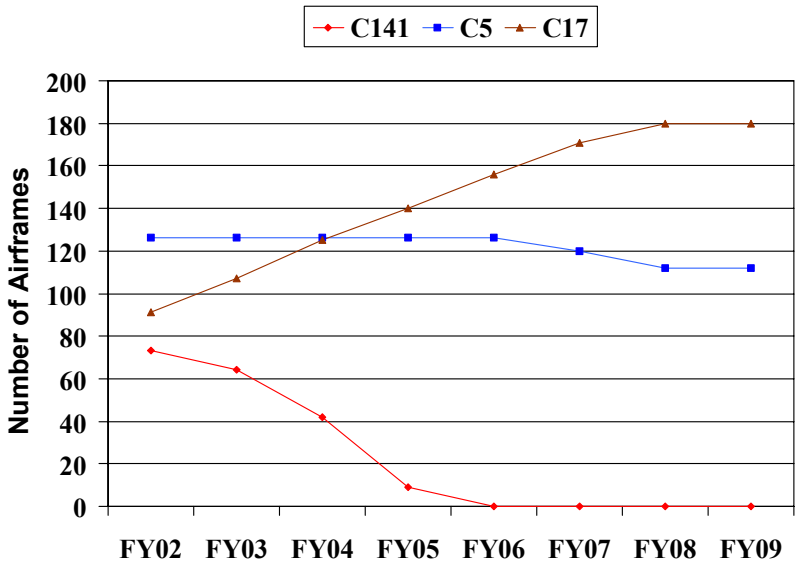
Table 3. MRS-05 Baseline Cargo Assumptions

54.5 Total Cargo Requirement
6.2 Intra-theater (all organic)
48.3 Inter-theater
27.8 Organic
20.5 CRAF

This allocation between CRAF and military airlift was based on DoD's assessment that the military could not effectively use more than 20.5 MTM/D of commercial airlift capacity in the MRS-05 planning scenarios owing to constraints in airport capacity, cargo handling capabilities, and the assumption that CRAF would only carry bulk cargo.[9]

[9] Air cargo falls into three categories: bulk, oversize, and outsize. Bulk cargo will fit on standard cargo pallets (463L pallet) with 96 inch height; oversize cargo does not meet standard pallet dimensions. Outsize cargo can fit only on a C-5 or C-17 aircraft. See USTRANSCOM Handbook. Recent work done

In looking beyond the MRS-05 timeframe, it is necessary to update these calculations to reflect the new factors that will drive changes in demands. First, Figure 3 shows that DoD will retire C-141 aircraft and some older C-5 aircraft, as it adds to the inventory of C-17 aircraft. Currently, DoD has programmed to buy 180 C-17s, to be delivered by 2008. (Of these, budgets have been approved for 150 aircraft.) On balance these additions will significantly increase DoD's organic airlift capacity. The Commander of U.S. Transportation Command has proposed that the acquisition of C-17s be continued beyond FY2008, in order to expand the inventory to at least 222 aircraft.[10]



Source: HQ AMC Briefing, 30 October 2002

Figure 3. Planned Inventories of Military Cargo Aircraft by Type

To demonstrate the sensitivity of CRAF estimates to the size of the C-17 fleet, Table 4 calculates the effect on CRAF requirements of larger C-17 fleets. We have examined fleets of 150, 180, and 240 aircraft. CRAF requirements are calculated as the difference between each level of military capacity and the required inter-theater airlift capacity of 48.3 MTM/D identified in MRS-05. [11]

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by the Program Analysis and Evaluation Directorate, Office of the Secretary of Defense (OSD), finds that it is practical – up to a limit – for CRAF aircraft to carry oversize as well as bulk cargo.

[10] General Handy's position on the need for additional C-17s is reported in: John A. Tirpak, "Mobility Boom," *Air Force*, The Air Force Association, Vol. 85, No. 6, June 2002.

[11] We consider cases that remove the assumption in the MRS-05 analysis that CRAF could provide only 20 MTM/Day in usable cargo capacity. Recent analysis by OSD's Office of Program Analysis and

The second column shows the QDR base case requirement for a fleet of 120 C-17s. Columns three, four, and five illustrate the impact of alternative numbers of C-17s on military inter-theater capacity.[12] The requirement for CRAF ranges from a low of 13.3 MTM/D with a C-17 fleet of 240 aircraft to a high of 23.2 MTM/D if the fleet of C-17s were to be held to only 150 aircraft.

Table 4. Tradeoff Between Military and CRAF Cargo Capacity

Segment	QDR Base Case 120 C-17s	*CRAF Needs vs. C-17 Fleet Size*		
		Lower Bound Planning Case 240 C-17s	Currently Approved C-17 Program 180 C-17s	Currently Funded C-17 Program 150 C-17s
Inter-theater	*48.3 required* 27.8 Organic 20.5 CRAF	*48.3 required* 35.0 Organic 13.3 CRAF	*48.3 required* 28.3 Organic 20.0 CRAF	*48.3 required* 25.0 Organic 23.2 CRAF
Intra-theater/special missions	NOT MET	6.2 Organic 54.5 Total	6.2 Organic 54.5 Total	6.2 Organic 54.4

b. Alternative cargo planning cases

A key goal of DoD's transformation initiatives is to field smaller, lighter, more lethal forces that can be deployed to distant locations in a matter of hours or days to swiftly defeat an opponent. The 2001 QDR established the following logistics-related goals for transforming the U.S. global military posture:

- "Develop a basing system that provides greater flexibility for U.S. forces in critical areas of the world, placing emphasis on additional bases and stations beyond Western Europe and Northeast Asia.

Evaluation found that the assumption that CRAF could only carry bulk cargo was too restrictive, and that CRAF can move a significant fraction of oversize cargo. Second, if DoD moves to an Intermediate Staging Base approach, numerous airports could be equipped to accept CRAF aircraft and trans-load to military aircraft, thus relieving assumed constraints on airport capacity and cargo handling equipment.

[12] These calculations assume that the equivalent of 6.2 MTM/D of C-17 capacity is allocated to meet the intra-theater lift requirements. As noted earlier, the 6.2 MTM/D requirement is not met in the QDR scenario.

- Provide temporary access to facilities in foreign countries that enable U.S. forces to conduct training and exercises in the absence of permanent ranges and bases.
- Redistribute forces and equipment based on regional deterrence requirements.
- Provide sufficient mobility – including airlift, sealift, pre-positioning, basing infrastructure, alternative points of debarkation, and new logistical concepts of operations – to conduct expeditionary operations in distant theaters against adversaries armed with weapons of mass destruction and other means to deny access to U.S. forces." [13]

The operational plans resulting from these revised assumptions probably will entail fewer passengers and less cargo to be deployed into the combat zone over the course of the conflict. But air delivery in the early days is likely to be emphasized and could logically be expected to reach the physical capacity limits of destination airfields, given the emphasis placed on swift action. Moreover, although U.S. strategy will increase demands for rapid deployment, the composition of U.S. forces will probably still include a large proportion of today's heavier equipment. Consequently, DoD's requirements in 2010 could involve a broader, more demanding range of possibilities that require an expanded fleet of organic military aircraft and CRAF aircraft that can deliver large amounts of bulk, oversize, and outsize cargo to intermediate staging bases.

Another critical factor in future operations is the need to operate in threat environments involving weapons of mass destruction and global terrorism. One response is to rely on intermediate staging bases that would allow much of the logistics support infrastructure to remain outside of the immediate combat zone. This would necessitate trans-loading passengers and cargo from CRAF to organic military aircraft for movement into the combat zone. The added costs of the trans-loading operations could significantly increase total airlift requirements, and would limit the effective use of CRAF aircraft to the initial trans-oceanic leg from the US to the staging base.

The calculations reported in Table 5 demonstrate the effect of alternative planning assumptions on DoD's demands for CRAF. This table presents baseline calculations for the QDR base case assumptions and the currently approved C-17 acquisition program, as well as lower- and upper-bound estimates of the CRAF capacity associated with alternative C-17 buys. We also give the results for the three alternative planning cases discussed in Appendix D:

[13] Quadrennial Defense Review Report, September 30, 2001, p.26.

- Case I: Conservative military planning factors. Some experts have recommended more conservative planning assumptions to those used in MRS-05. [14] This case examines the effect of reducing the assumed availability and productivity of military cargo aircraft by 20 percent.
- Case II: Case 1 + Greater use of time-definite delivery. This encompasses the range of results we obtained by exploring the potential impact of time-definite delivery on military and CRAF requirements. This logistics approach likely will reduce cargo load factors and aircraft utilization rates somewhat because it requires tightly coupled scheduling.
- Case III: Case II + Greater reliance on intermediate staging bases. Greater reliance on ISBs adds the need to trans-load cargo from commercial to organic military aircraft. In effect, this will require an increase in overall capacity capability in order to sustain a given flow of cargo through the pipeline.

c. Calculations

Our calculations show that cargo requirements could vary substantially, depending on DoD's future logistics approach. We believe a "prudent" planning target for CRAF is 25 ± 5 MTM/D. This estimate is about 25 percent higher than the MRS-05 target of 20 MTM/D. It encompasses the baseline planning case and provides additional robustness, and would provide a cushion for introducing new logistics concepts that require more commercial airlift augmentation.[15]

[14] For example, a RAND Project Air Force Study, *Finding the Right Mix of Military and Civil Airlift, Issues and Implications*, 1994, Executive Summary, p.15, concluded that "optimistic planning factors have caused airlift capability to be overestimated…. . For the C-17, the Air Force's utilization goal of 15.65 hours per day contrasts with our estimate of 12.2 hours per day under ideal scheduling conditions." The Air Force subsequently reduced this goal to 15.15 hours per day, which is the number that was used in MRS–05. Moreover, the fact that MRS–05 essentially assumed near-perfect conditions with regard to scheduling, communications, and weather also supports the need to explore the ramifications on CRAF of more conservative projections of organic military capacity.

[15] Appendix D considers some possible, but less likely, upper and lower bounds for CRAF planning. We believe an upper-bound cargo planning estimate of about 35 MTM/D is appropriate for strategic planning purposes. This number is about mid-way between the 240 C-17 aircraft Case III lower-bound estimate and 180 C-17 aircraft prudent case estimate. It also is mid-way between the prudent estimates calculated for Cases II and III. We believe a lower-bound cargo planning estimate of about 15 MTM/D is appropriate. This number is slightly more than the calculated lower-bound estimate of the Baseline Case, which we derived using MRS-05 planning factors.

Table 5. CRAF Demands for Alternative Planning Cases

Planning Assumption	QDR Base Case 120 C-17s	*Total Cargo Requirements, Military Fleet, and CRAF*[1] *(All figures are in millions of ton miles per day)*		
		Lower Bound 240 C-17s	Current Program 180 C-17s	Funded Program 150 C-17s
Baseline	*48.3 Required* 27.8 Organic 20.5 CRAF	*48.3 Required* 35.0 Military 13.3 CRAF	*48.3 Required* 28.3 Military 20.0 CRAF	*48.3 Required* 25.0 Military 23.2 CRAF
Case I: Conservative military planning factors (-20% reduction in capability)		*48.3 Required* 28.0 Military 20.3 CRAF	*48.3 Required* 22.4 Military 25.9 CRAF	*48.3 Required* 20.0 Military 28.3 CRAF
Case II: Case I + Time-definite delivery (+15% increase in the total capacity required)		*55.5 Required* 28.0 Military 27.5 CRAF	*55.5 Required* 22.4 Military 33.1 CRAF	*55.5 Required* 20.0 Military 35.5 CRAF
Case III: Case II + greater reliance on ISBs (an additional +10% increase in total capacity required)		*61.0 Required* 28.0 Military 33.0 CRAF	*61.0 Required* 22.4 Military 38.6 CRAF	*61.0 Required* 20.0 Military 41.0 CRAF

[1] These calculations assume that up to 36% of CRAF cargo could be oversize. DoD currently does not assign oversize cargo to CRAF in its war plans. However, as discussed in Appendix D, a recent OSD Office of Program Assessment and Evaluation study finds that widebodied CRAF aircraft could carry a substantial fraction of oversize cargo.

The calculations of requirements for intermediate staging bases indicate that greater capacity will be needed to sustain a given rate of supply, because capacity is tied up in an additional trans-shipment operation. The calculations do not reflect the possible constraints on the effective use of CRAF aircraft, due to the fact that these aircraft would be limited to serving only the initial overseas leg from the US to the staging base. The effective mix of CRAF and military aircraft would vary across scenarios, depending on the length of the initial overseas leg relative to the length of the leg from the staging base into the combat zone.

2. Passenger requirements

Although MRS-05 focuses on deploying military units and capabilities and does not explicitly address personnel deployments, it does establish a CRAF Stage III capacity requirement of 130 million passenger miles per day (MPM/D). As discussed in Appendix D, the need for this much CRAF passenger capacity in 2010 and beyond is not likely for three reasons. First, the Secretary's direction to transform U.S. military forces and swiftly defeat foes with fewer forces and less logistics support is likely to produce results.

Second, the new warfighting and advanced mobility concepts that are being examined also will likely yield some beneficial results. Finally, the possibility remains that the U.S. might have to place increased reliance on ISBs and not fly CRAF aircraft forward of these areas.

We believe the "prudent" planning target for CRAF is about 100 ± 10 MPM/D. This equates to a reduction in needed capacity of about 25 percent from MRS-05.[16]

3. Aero-medical evacuation requirements

The current aero-medical evacuation requirement is for 32-40 CRAF aircraft. This requirement is based on several factors, including the projected casualties associated with the types of operations envisioned and estimated cycle times. The Air Force currently is reviewing the aero-medical evacuation requirement for CRAF.[17] In light of this ongoing review, it is prudent at this juncture to continue to plan for 32-40 aircraft for this purpose, given the specialized nature and criticality of this capability and the relatively small number of aircraft involved.

B. DECLINE OF THE DOD PEACETIME BUSINESS BASE FOR CARGO CHARTER AIRLINES

As DoD expands the C-17 fleet, it will reduce or eliminate the peacetime charter cargo business base, which has been a key component of DoD's incentives for airlines to participate in the CRAF program.[18] Possible scenarios are presented here in order to provide a better understanding of how the incentives to participate in CRAF are likely to change in the coming years.

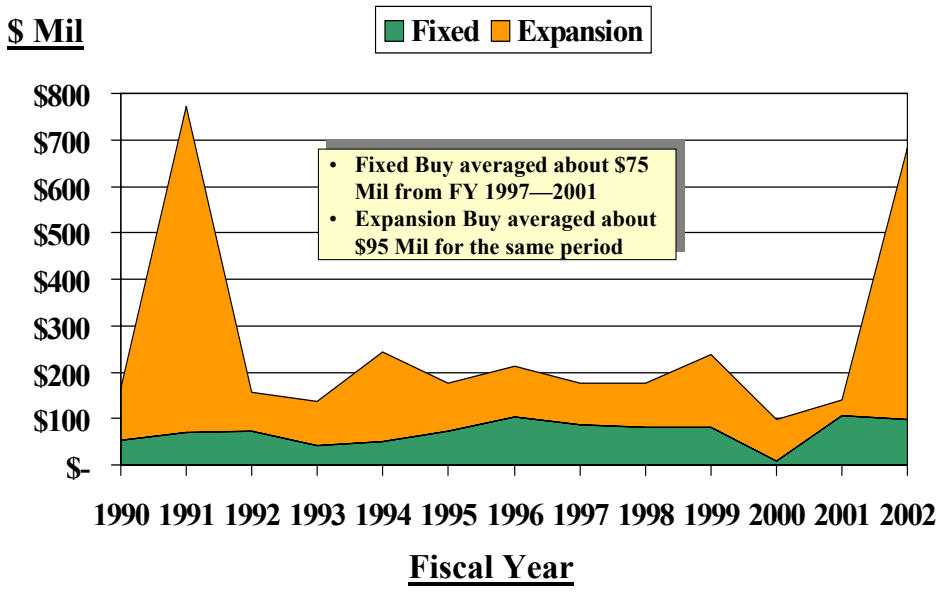
We use recent experience as the starting point for forecasting the peacetime business base. CRAF-linked charter cargo revenues for the period FY 1990-2002 are shown in Figure 4. The period FY 1997-2001 provides a conservative basis for forecasting DoD's future requirements: The fixed buy, which is an annual contract for scheduled service and predicted demands, averaged about $75 million per year. The

[16] A higher wartime passenger planning estimate of about 120 MPM/D is appropriate to hedge against uncertainty and establish some buffer capacity in the event that ongoing initiatives do not bear fruit by 2010.

[17] The Air Mobility Command indicates this internal review is ongoing, and a completion date has not been established.

[18] As this report was being prepared, the DoD entered into negotiations to lease 100 Boeing B-767 aircraft for use as tankers. These aircraft will also have cargo-carrying capabilities. The use of these aircraft for DoD's peacetime cargo operations would create additional reductions in the peacetime business base, over and above those presented here.

expansion buy, which includes individual short-notice requirements, averaged about $95 million per year. In 2002, Operation Enduring Freedom and the War on Terrorism sharply increased the demand for cargo charters to almost $700 million, nearly approaching the levels reached during the Gulf War.



Source: Data provided by HQ AMC Contracting Office, November 13, 2002

Figure 4. CRAF-Linked Cargo Revenues, FY 1990 – 2002

In extrapolating from this experience, two underlying factors need to be weighed. First, it is likely that Operation Iraqi Freedom and the War on Terrorism will entail a protracted level of activity that will sustain DoD's airlift requirements well above the baseline level of $170 million per year for at least the next several years, and perhaps for much of the remainder of this decade. Second, an opposing long-term trend is the growing shift of DoD cargo traffic away from military aircraft and cargo charters toward commercial transportation channels. For example, there has been significant growth in Direct Vendor Delivery (DVD) contracts, under which DoD's suppliers arrange for commercial transportation services to deliver products directly to end users or local distribution centers. This shifts these deliveries out of the DoD-managed transportation system. It is generally agreed that the share of DoD logistics support traffic flowing through this channel is significant and steadily growing, although systematic data are not available.

To examine the range of possibilities, we have projected the CRAF peacetime business base under two alternative assumptions regarding DoD's total requirement for airlift. The first is based on the baseline average prior to Operation Enduring Freedom. The second extrapolates from the peak demand levels reached in 2002. Table 6 shows the relationship between C-17 fleet size and the business base for commercial charter carriers under these alternative assumptions. For example, expanding the DoD fleet from its current size (90 aircraft) to 120 aircraft in the base case would reduce cargo charter revenues from the baseline average of $170 million to $30 million.

Table 6. C-17 Fleets and the Charter Airlines' Peacetime Business Base (Fixed buy + Expansion)* (Millions of dollars per year)

C-17 Fleet Size (year achieved)	Extrapolated Cargo Charter Revenue		Extrapolated Passenger Charter Revenue	
	Using Baseline Average	Using 2002 Peak	Using Baseline Average	Using 2002 Peak
90 (current fleet)	$170 M/yr	$700 M/yr	$330 M/yr	$500 M/yr
120 (2004)	30	560	330	500
150 (2006)	0	420	330	500
180 (2008)	0	280	330	500

* Appendix D shows that under current Flying Hour program assumptions and working capital fund accounting practices, each additional C-17 placed in the active fleet displaces about 4.7 million in commercial cargo charter revenue.

In the baseline demand case, a fleet of about 125 C-17s, operating under current peacetime practices, would be capable of serving DoD's entire peacetime cargo market. Hence this would reduce the peacetime CRAF business base to zero. At the much higher 2002 levels of demand, however, the charter market was $700 million/year. In this case, a charter market of $280 million would remain, even after all of the currently programmed 180 C-17s are delivered.

On balance, it is likely that the peacetime business base will remain significantly above the baseline level for at least the next several years. However, if and when DoD operations return to previous peacetime levels, the business base for commercial cargo charters will be altogether eliminated. As discussed subsequently, this would force DoD to revise the incentive system for CRAF.

On the passenger side, our extrapolation of the peacetime business base is not affected by the addition of C-17s to the fleet. During FY 1997-2001, the combined fixed

and expansion buy averaged about $330 million per year – almost twice the average cargo buy of $170 million per year for the same period. This is attributable to the fact that DoD relies on the commercial sector for virtually all of its passenger movement needs. DoD has no plans to purchase passenger airlift, thus the demand for commercial augmentation is not directly affected by DoD's C-17 investment decisions.[19]

C. AIR CARGO SUPPORT FOR SUPPLY CHAIN INTEGRATION IN THE U.S. ECONOMY

A third demand-side consideration arises from the possibility that CRAF call-ups might disrupt critical civilian demands for air cargo that may be directly or indirectly needed to support a war effort. Because the U.S. economy has become increasingly tightly integrated, with some firms heavily committed to just-in-time supply chain systems, there is some concern that a war effort would require cargo air carriers to provide increased just-in-time logistics support to critical industrial customers. These competing demands need to be considered in planning for the future use of CRAF.

Our assessment, reported in Appendix E, finds that domestic supply chain requirements are not likely to represent a significant constraint on the desired use of CRAF. The scale of CRAF call-ups compared to the nation's total capacity is such that the risk of significant economic dislocation is quite small. It can be expected that market forces would allocate the remaining supply of express delivery capacity to the highest priority users, and that other users would shift to ground or rail transportation. As a check on this approach, we asked for the views of major integrated carriers. They concurred that some substitution would occur among suppliers. They also noted that air carriers could significantly expand their capabilities if more customers shifted to a slower class of service.

[19] One possible change affecting the peacetime charter business would be the elimination of DoD's scheduled Patriot Express passenger flights, and a shift of that traffic to the GSA City Pairs Program. The study did not assess the effects of such a change.

IV. CRAF ISSUES AND MANAGEMENT CHALLENGES

Adapting to the expected changes in aviation supply and DoD demands will require significant innovations in the management of the CRAF program. The fundamental conditions nevertheless will remain in place for CRAF to continue as a win-win partnership between DoD and the aviation industry. We describe here four broad initiatives that will be needed in order to sustain and enhance this partnership:

- Improved operational planning for using CRAF
- More robust, efficient incentives for CRAF participation
- A DoD strategy to address proposed changes in international ownership regimes
- An effective and efficient balance of military and commercial airlift.

A. IMPROVED OPERATIONAL PLANNING FOR EMPLOYING CRAF

Recommendation: DoD's war plans and exercises should examine future airlift operational concepts that enhance the effectiveness of CRAF and address limitations on the employment of CRAF. To facilitate this, DoD should establish a DoD-industry CRAF operational planning group.

Over the last decade, the DoD logistics community has adapted to lessons learned from Desert Shield and Desert Storm, and has implemented numerous initiatives designed to improve the responsiveness and efficiency of logistics operations. These initiatives increase DoD's reliance on airlift. In FY 2002, the Defense Logistics Agency reported that air transportation accounted for 56 percent of its worldwide shipments and 97 percent of its overseas shipments.

In future combat scenarios, DoD's logistics concepts envision critical time-dependent reliance on air transportation for both deployment and sustainment. The traditional approach in which aircraft and crews are activated and plugged into the DoD logistics system may have been workable for traditional logistics concepts, but modern logistics concepts will require a more integrated operation than can be achieved under such an approach.

Many CRAF participant airlines support the creation of a systematic framework for joint DoD-airline planning, exercises, and problem solving on operational matters. Some airlines proposed creating a standing strategic planning group for CRAF, similar to the industry committee that meets with DoD to discuss the Voluntary Intermodal Sealift

Agreement (VISA). Such a group would provide a basis for improving CRAF operational utility to DoD, and would provide a forum for addressing emerging operational concepts and concerns. The work of this group could be enhanced significantly if it were complemented by occasional CRAF-related exercises, or operational lessons-learned assessments, that focus on defining the operations concepts for CRAF in support of military operations.

As in most complex operations, there are many unknowns associated with future CRAF operations that can best be resolved with careful advanced planning and practical experience. We have identified four areas that can usefully be addressed through such a mechanism. In addition to areas discussed here, there is no doubt a wide range of other technical and policy issues that could be identified and resolved with the kind of learning-by-doing afforded by advance planning and exercises.

1. Integrating CRAF with a transformed military

The Persian Gulf War highlighted the value of CRAF, and the experience provided the basis for a number of improvements in the program.[20] As might be expected in this first-ever CRAF activation, after-action reviews identified several operational problems – many of the sort that could to be identified and corrected with improved planning and exercises:

- CRAF Mission Planning and Scheduling. Integrating CRAF into an ongoing military operation proved to be a difficult endeavor that overtaxed military planners on several different occasions. This resulted in mission delays and cancellations and the underutilization of available commercial aircraft.
- Lack of Effective Communications and Protective Gear. The CRAF commercial aircraft and crews participating in the operation did not have military communications or aircraft survivability equipment. They lacked effective communications with military air controllers and CRAF aircraft were restricted to operate well outside potential threat areas. Moreover, DoD did not provide CRAF crews who were participating voluntarily with chemical or biological protective clothing, equipment, or training prior to or during the War.

The ability to integrate mission planning and scheduling will be essential in coordinating activities where security alliances are as fluid as they have been in recent

[20] These issues are discussed in Appendix A. See also, James K Matthews and Cora J. Holt, *So Many, So Much, So Far: United States Transportation Command and Strategic Deployment for Operation Desert Shield/Desert Storm*, Joint History Office of the Joint Chiefs of Staff and Research Center, USTRANSCOM, 1996.

operations. U.S. airlines have relied on their international alliance partners to serve many regions of the world, reducing their presence and control of ground support facilities, particularly in Africa and the Middle East where foreign alliance partners increasingly serve the markets. In addition, airlines serving CRAF missions may be restricted from using support facilities in countries that object to U.S. military operations. DoD-industry planning capabilities need to be capable of addressing these situations. The Gulf War highlighted the concern that airlift operations could be vulnerable to the threat of tactical ballistic missile strikes against allied air bases. The growing concern that some of these missiles might be carrying weapons of mass destruction also impacted military operations and the use of CRAF.[21]

In addition, we noted earlier that DoD's increasing use of DVD contracts creates a peacetime logistics supply chain that often flows entirely outside DoD's traditional logistics management processes and information systems. DoD and the CRAF airlines can work together through the proposed planning framework to better plan for handling DVD traffic in transitioning from peacetime supply flows to deployed operations.

2. Employing the airlines' "transformational" capabilities

The proposed CRAF planning framework also would provide a mechanism for DoD to work with industry in developing and implementing operational concepts that allow the Department to make fuller use of the airlines' capabilities. Many of the transformational capabilities that DoD seeks to implement in the Defense Transportation System are already widely employed by the commercial airlines. For example, the cargo carriers have extensive information systems that could be employed to support scheduling and asset visibility. They also have extensive ground transportation and cargo handling facilities. Over time, DoD should move away from the traditional CRAF approach of contracting simply for aircraft, crews, and flight support toward contracting for a more complete package of logistics services.

3. Employing Intermediate Support Bases (ISBs)

During Operations Desert Shield and Desert Storm, tactical ballistic missile attacks and the threatened use of weapons of mass destruction altered how CRAF was employed. The threat of global terrorism also will alter how we use CRAF in the future. In order to reduce risks and preserve the viability of the CRAF program, DoD needs to

[21] LtCol Cheryl Mach, *Asymmetric Warfare, ibid.*

begin to plan and prepare for using CRAF in such hostile scenarios. One solution would be for DoD to fly some or all CRAF aircraft to relatively secure intermediate support bases and to trans-load cargo and passengers to military aircraft for movement to forward sites. This is how operations have been conducted for Operation Enduring Freedom, where the military has relied on major CRAF augmentation, but without U.S. airlines operating directly into that country.

Employing this approach for major operations will require significant advance planning and adaptation on DoD's part. In the case of passengers, the ISB concept requires trans-loading passengers from commercial to military aircraft. DoD is not presently prepared to support the volume of passenger traffic over the final military leg of this operation, since this approach would create significant new demands for short-haul troop carriers. Current military aircraft are not well-suited to this function; they are optimized for cargo. In the case of air cargo, the ISB concept also entails preparations for an additional trans-loading operation. This added step entails more time, crews, and equipment. DoD's logistics systems would need to support logisticians in managing supply stocks spread among U.S. ports, intermediate staging bases, and in-theater caches.

4. More systematic treatment of crewing considerations in CRAF planning

Crewing considerations represent the final planning element that will be critical for the future success of the CRAF program.

The first consideration is crew training, security, and personnel protection. As noted earlier, there was concern following the Persian Gulf War that CRAF crews were not well prepared to fly missions into that theater. A second related concern is that some flight crews may not be willing to volunteer for CRAF missions in the future because of the increased threat of terrorism against U.S. airlines supporting CRAF, or the threat of attacks on U.S. logistics bases.

To respond to these challenges, DoD may need to institute new mechanisms for managing CRAF crew commitments. For example, the Department could institute a tiered commitment system: a certain fraction of CRAF crews could be asked for firm commitments for riskier missions, such as those that fly into, or adjacent to, combat zones. These commitments could be contractual, or DoD could establish a special category of military reserve status for the crews supporting CRAF. Such crews could be given specialized training in CRAF operations and procedures, security, and personnel protection, and then would come under a legal obligation to support the CRAF program.

The remainder of CRAF crews would operate under current rules, and their voluntary commitments could be limited to flying relatively low-risk missions.

B. ALTERNATIVE INCENTIVES FOR CRAF PARTICIPATION

Recommendations:
Over the next two to five years, DoD will need to modify or replace the incentive system for CRAF participation.

- ***-- DoD should consult with the CRAF airlines to consider alternative incentive systems that promise greater efficiency, equity, and robustness against business cycles and the expected reductions in the peacetime charter business base.***
- ***-- Under the current system, "Fly America" is essential, because it provides strong incentives for major U.S. airlines to participate in the CRAF program.***

The current CRAF program reflects several changes that were made to strengthen incentives for CRAF participation as a result of the lessons learned from the Gulf War. Foremost among these was the decision in 1995 to impose minimum CRAF commitments for airlines serving government passenger and cargo markets.[22]

Table 7 describes the categories of government business to which CRAF commitments are linked. For about 60 percent of the peacetime government business base ($755 million), eligibility to serve the market is tied to a minimum commitment to CRAF. A 30 percent commitment of total long-haul capacity is required in order for an airline to bid for business in GSA markets or DoD charter markets. In the Category A cargo market, the minimum commitment is 15 percent.

CRAF is linked to the remaining 40 percent of the government business base ($535 million) through the mobilization value (MV) point system. As described in Appendix A, MV points are awarded to airlines (or teams of airlines) based on the number and kinds of aircraft they commit to each tier of CRAF. Each team is awarded a share of peacetime business that is roughly in proportion to its total share of MV points. Thus, if a team were to commit roughly half of the contingency capacity (as weighted by the MV point system), it would receive roughly half of the peacetime business.

[22] Other changes in incentives included changing existing aviation insurance provisions to reduce the air carriers' asset risk and ensure that the loss of an aircraft would not unduly burden the carriers financially. CRAF participants were allowed during peacetime to operate from military airfields and to designate military airfields as weather alternate landing sites to encourage their participation in CRAF. Operational offsets also were added so that carriers of activated aircraft were reimbursed at a rate of ten hours of flying, whether the aircraft flies that many hours or not.

Table 7. CRAF-Linked Government Business

Business Category	Annual Business ($ millions)	CRAF-Linkage Provisions	Comment
Business that Requires a Minimum Fleet Commitment			
GSA City Pairs Program (Individually ticketed DoD, other government, and government contractor personnel.)	$ 560 million	Commitment: 30 % of long-range fleet	Total City Pairs eligible revenue is about $1 billion; Due to waivers and incomplete enforcement, about 40% of eligible revenue goes to non-CRAF carriers
Domestic Charter (Full-planeload domestic passenger charters.)	$ 62 million	Commitment: 30 % of long-range fleet	
Express Cargo – Domestic (Domestic, small parcel, office to office shipment for DoD other government agencies, and cost-reimbursable government contractors)	$ 98 million	Commitment: 25 % of long-range fleet; 30% for both domestic and international	
World-Wide Express Cargo (International, small parcel, office to office shipment for DoD other government agencies, and cost-reimbursable government contractors)	$ 35 million	Commitment: 25 % of long-range fleet; 30% for both domestic and international	
Business that is Allocated in Proportion to Commitments (Mobilization Value Points)			
Category A Cargo (Palletized cargo, less than full planeload, pick up and drop off at military depot.)	$ 55 million	Business allocated in proportion to MV points; Minimum Commitment: 15 % of long-range fleet	
AMC Passenger Charter (International full-aircraft passenger charters.)	$ 300 million	Business allocated in proportion to MV points; Minimum Commitment: 30 % of long-range fleet	"Fixed-buy" charters are specified for each contract year; "Expansion buys" meet short-notice requirements.
AMC Cargo Charter (International full-aircraft cargo charters.)	$ 180 million	Business allocated in proportion to MV points; Minimum Commitment: 15 % of long-range fleet	"Fixed-buy" charters are specified for each contract year; "Expansion buys" meet short-notice requirements. Cargo Charter Business will be displaced by organic C-17s

The airlines and DoD recognize several advantages and disadvantages of the current incentives approach. The important advantages are:

- DoD has obtained more than adequate capacity commitments since the mid-1990s. As noted earlier, the program currently is heavily over-committed relative to needs.
- The program is voluntary.
- No direct federal expenditures are required to obtain commitments.

On the other hand, the efficiency and equity of these incentive systems have been called into question by the airlines and outside observers. Appendix A describes and evaluates the issues, which are summarized as follows:

- The current MV point incentive system relies exclusively on charter revenues to generate incentives for CRAF participants. As we showed earlier, the planned reductions in cargo charter business will reduce or eliminate this element of the incentive system.
- Under the current teaming arrangements, the majority of potential CRAF participants are not directly compensated by AMC. Fully 85 percent or more of committed CRAF capacity for cargo, passengers, and aero-medical evacuation is pledged by airlines that are not doing peacetime business with AMC.
- Because of the teaming arrangements, and the use of minimum fleet commitments for obtaining government business, the incentive compensation provided to an airline does not correlate closely to its CRAF activation risk. The estimated peacetime incentive revenue is much higher for some aircraft than for others.
- AMC's cost-based pricing methodology does not reflect market conditions.

The current system is working to provide DoD with more than adequate commitments at no direct subsidy cost to the Department, and this strength alone provides a good case for retaining the current system. Nevertheless, there is a risk that the planned reductions in the peacetime cargo business base will prevent the system from working beyond the next two to five years. There is a need for DoD to consider the viability of the existing system, as well as to begin to evaluate alternatives that will improve the effectiveness and efficiency of the system.

2. Alternative incentive systems

The study team developed the CRAF Incentive Model to assess the incentive effects of current provisions and to evaluate alternatives. The model and the details of the assessments are described in Appendix C. The model shows that the linkage through the minimum commitment is a strong incentive for airlines to participate in CRAF. The

historical record is consistent with this finding: CRAF participation increased significantly when this requirement was first imposed in the mid-1990s.

Our assessments also show that the MV point system is effective in inducing airlines to make commitments in excess of the minimum. For the charter carriers, which rely heavily on DoD business, this incentive is quite strong. Many scheduled airlines also have made commitments well in excess of the 30 percent minimum, but their incentives to participate will vary significantly over the business cycle.

Four alternative incentive systems are described. They entail the following main characteristics:

- Status quo: Continue the existing system of required minimum aircraft commitments ("Fly America"), MV point awards, and teaming – a baseline examination of the sustainability of the current approach under changed conditions.
- Status quo+: Continue the existing incentive structure, but with cost-effective changes in specific incentives necessary to meet future CRAF requirements.
- Pure competitive bidding: Capacity commitments based on an efficient competitive auction framework such as employed by the government in other areas.
- Hybrid approach: Thirty percent capacity commitments for doing business with the government are retained as a national "call-up" commitment. The remaining commitments are based on an efficient competitive auction framework.

a. Status quo

We used the CRAF Incentives Model to assess the viability of the current program given the expected reductions in the peacetime business base. The calculations also examine the effect of an improved economy on incentives, because our analysis suggests that major airlines will have weakened incentives to participate once the economy begins to recover. The estimates are reported in Table 8.

The top row presents current actual CRAF commitments (MTM/D for cargo and MPM/D for passenger); the next two lines report the model results assuming the baseline charter cargo business base of $170 million per year. To illustrate business cycle effects, the estimates are provided both for a period of economic weakness as well as one of economic strength. Finally, the last two lines report participation levels when the cargo

peacetime buy is eliminated, again assuming either economic weakness or economic strength.

The analysis shows that the CRAF minimum commitment requirements for eligibility to serve government markets provide a strong incentive for CRAF participation. These incentives are closely linked with the government's "Fly America" provisions, which give U.S. airlines exclusive access to government passenger and cargo business. As noted earlier, this is a market of over $2 billion per year.

The calculations also show that there are substantial impacts on the participation of charter and scheduled cargo operators if the peacetime buy were to be eliminated. The third column shows that the current total CRAF cargo commitment is 39 MTM/Day. With the current cargo business base, the recovery of the U.S. economy will increase the airline's opportunity costs of CRAF commitments, reducing their commitments to 28.2 MTM/Day. Eliminating the peacetime cargo business base would cause significant additional reductions in CRAF participation. Depending on the exact circumstances, total commitments would fall in the range of 10-20 MTM/Day. The CRAF program faces substantial risks that the incentive system will not be capable of sustaining adequate CRAF participation if the peacetime cargo business base is eliminated.

Table 8. The Business Base and Business Cycle Drive Incentives

Scenario	Millions of Ton Miles/Day			Million Passenger Miles/Day		
	Cargo (Target = 25 MTM/D +/- 5)			Passenger (Target = 100 MPM/D +/- 10)		
	Charter	Scheduled	Total	Charter	Scheduled	Total
Current Actual CRAF Commitments (October 2002)	16.8	22.2	39	8	188	196
With Baseline Cargo Charter Business Base ($170 M):	16.8	22.2	39	8	98	106
Economic Weakness (Current commercial rates)						
Economic Strength (Year 2000 commercial rates)	16.8	11.4	28.2	8	60	98
Without Peacetime Charter Cargo Business Base:	0-9.8	11.4	11.4-21.2	8	98	106
Economic Weakness (Current commercial rates)						
Economic Strength (Year 2000 commercial rates)	0-9.8	11.4	11.4-21.2	8	60	98

b. Status quo +

Some modifications of the incentives within the current CRAF program structure might make it possible to meet requirements without requiring a radically new system.

The CRAF incentives model identifies some feasible alternatives. The model predicts that increases in the minimum commitments associated with government cargo business (Category A and Express contracts) would result in proportional increases in CRAF participation. This outcome is robust; that is, it survives fairly substantial business cycle swings or increases in carriers' perceived probability of call-up. Options to be considered would include:

- Increasing the minimum thresholds for participation in Category A and Express contracts.
- Changing the eligibility process so that aircraft counted for Category A eligibility could not be used to also cover eligibility for the Express contracts. For example, at the current eligibility criteria for Category A and Express contracts (15 and 30 percent of long-range fleet, respectively), the economic modeling suggests that minimum participation levels would increase from 30 percent to 45 percent of carrier fleets.

We find that incentives also could be increased through revisions to the current MV point system designed to more sharply target available business base incentives. Three key changes we have assessed are:

- Separate the minimum 30 percent commitment for the GSA City Pairs program and the Express program from the MV point system, and do not award MV points for these commitments. (Alternatively, assign significantly lower MV credit to aircraft used to satisfy the 30 percent commitment.)
- More closely link MV points to the probability of call-up. One approach would be a sliding scale of probabilities for smaller call-up increments. (Alternatively, Stages I and II could get significantly higher MV credit than Stage III.)
- Cap MV points according to DoD's needs. (Alternatively, capacity that is committed against DoD's goals could be given a higher weighting than assigned to any additional "hedging" capacity above DoD's goals.)

By targeting incentives more narrowly, this approach might enable DoD to secure adequate participation even with significantly reduced peacetime cargo business.

c. Competitive bidding

It is possible to improve the robustness and efficiency of the incentive system by replacing the MV point system with a competitive bidding process. Its main feature would be an auction-based system for establishing rates and commitments, in which each participating carrier contracts directly with AMC. Appendix F outlines such an approach. Some of the key advantages of this approach are that it would:

- eliminate cost-based rate setting,
- eliminate the MV point system and more closely tie government incentives to the value of the service provided,
- eliminate teams and the indirect allocation of business through an internal commission structure that is beyond the influence of DoD,
- permit DoD to capture the gains from the reduced peacetime costs, rather than permitting the teams to capture these gains.

The basic approach would be to allow all eligible U.S. carriers to bid for AMC charters and Category A cargo based on competitive price and service. This competitive marketplace would emphasize longer-term contracts but would also include spot-market transactions as required. It could be managed using the electronic-business framework already in place. The envisioned system would be similar to the competitive bidding framework used for sealift charter.[23]

In addition to this peacetime marketplace, AMC also would establish a market for contingency commitments. These would establish rates, terms, and conditions under which the government could "call up" committed capacity. Several new administrative mechanisms would be necessary to implement this approach. For example, to establish the bounds for the reasonableness of the rates for contingency commitments, AMC could

[23] The global contract for container traffic is a "universal services contract" for peacetime services; it is a method for providing for ocean liner participation in DoD container transportation. Estimates are made of volume on routes; ocean liners bid for whatever routes they desire. Incentives to participate include minimum guarantees to the selected ocean liners. Bids are evaluated on the basis of cost and performance and a ranking is established which is followed in awarding the peacetime business. There is an exception: a shipper (such as DLA) can choose a carrier that best meets its need for a specific shipment, but this seldom occurs (less than five percent of the time).

VISA (Voluntary Intermodal Sealift Agreement) participants agree on pre-established wartime rates if stages are activated. The government decides which ships to activate. There are three stages (I, II, and III) within which the shippers volunteer to participate. Participation in VISA is not required for participation in the peacetime global contract for container traffic, but does affect rankings in the contract.

continue to require CRAF participating carriers to submit Form 41 operating cost data to AMC.

In evaluating the impact of this approach on the cost to the government, we have used the CRAF Incentive Model to estimate the magnitude of the payments that would be necessary to induce current airlines to make their commitments. Table 9 provides estimated costs of the "retainers" that would be required both in strong and weak economic conditions.

Table 9. Estimated Peacetime "Retainer Fees" Needed to Sustain Participation

Key Scenario Assumptions	Cargo	
	Economic Strength	Economic Weakness
No minimum commitment for government business No DoD Peacetime Cargo Charter Business	$12.0 million	$3.0 million

We also assessed the costs of a variant in which airlines bid to set contingency mobilization rates that would take effect if airlines were called up. We found that the rate premium would be on the order of 20 to 40 percent.

d. Hybrid approach

The hybrid approach entails the continuation of existing minimum commitments for serving government markets, combined with an efficient auction for acquiring the needed aircraft above the minimum commitment. As with the purely competitive system, this approach eliminates MV points and teaming.

Table 10 summarizes the estimated peacetime "retainer" needed under this scenario. Imposing the minimum commitment reduces the necessary payments from about $12 million to $8.5 million in a strong economy, and from about $3 million to $2 million in a weak economy. Again we found that a contingency rate premium would be on the order of 20 to 40 percent.

Table 10. Estimated Peacetime "Retainer Fees" Needed to Sustain Participation (with minimum commitment required for government business)

Key Scenario Assumptions	Cargo	
	Economic Strength	Economic Weakness
Minimum commitment in place for government business No DoD Peacetime Cargo Charter Business	$8.5 million	$2.0 million

These preliminary assessments illustrate a range of options. Each represents a viable alternative to the current system and should be considered in establishing a follow-on to the current incentive system. One appeal of the competitive bidding approach is that it could provide long-term commitments while eliminating the problems built into the current incentive structure. Our assessments find that the budgetary cost of a "retainer fee" system is relatively small.

C. A DOD STRATEGY FOR ADDRESSING PROPOSED CHANGES IN INTERNATIONAL AVIATION REGIMES

Recommendation: DoD should implement a risk-management framework to assess and address likely proposals to change U.S. government provisions on foreign ownership of U.S. airlines

-- With adequate risk-management safeguards, DoD could effectively manage the CRAF program to meet national security requirements, even if the U.S. government were to raise the current ceiling on foreign ownership and control.

The third needed initiative for managing the CRAF program involves the creation of a DoD strategy for addressing likely proposals to liberalize international aviation ownership regimes. Discussed here are the kinds of changes that may be proposed and the key elements of the strategy for ensuring that national security needs are met.

The current national policy framework requires CRAF participants to be U.S.-owned and -controlled airlines. The rationale for this is that such airlines have strong incentives to participate in CRAF, as well as to meet their commitments when CRAF is activated. Raising the current statutory ceiling on foreign ownership of airlines would increase a foreign government's influence on participants, which introduces political risks in managing the program. Two provisions to mitigate these risks are discussed here. The first is to establish eligibility requirements that ensure a strong commitment from participants. The second is to institute a national security

review and approval process for individual applications to increase foreign ownership of U.S. airlines above the current ceiling. If the U.S. government were to adopt and effectively enforce these risk-mitigation provisions, DoD could manage the program and continue to meet national security needs, even if the current statutory ceiling were raised on foreign ownership and control. Judged from the perspective of the CRAF program, DoD's position on changes in the ceiling on foreign ownership hinges on its ability to institute and enforce these risk mitigation provisions.

1. Background: current U.S. law

Current U.S. law and practice form a strict framework of ownership and control requirements for U.S. registered airlines. The law defines an air carrier as "a citizen of the United States undertaking… to provide air transportation."[24] A "citizen of the United States" is defined as:[25]

- an individual who is a United States citizen;
- a partnership, each of whose partners is an individual who is a citizen of the United States; or
- a corporation or association organized under the laws of the United States or a State, the District of Columbia, or a territory or possession of the United States, of which the president and at least two-thirds of the board of directors and other managing officers are citizens of the United States, and in which at least 75 percent of the voting interest is owned or controlled by persons that are citizens of the United States.

As part of its process of granting an air carrier its initial operating authority, the Department of Transportation must determine that a carrier is a U.S. citizen. Although the statute requires that a corporation may be a U.S. citizen if it is owned *or* controlled by citizens of the United States, DOT has consistently interpreted the statute to require that such a corporation be *both* owned *and* controlled by U.S. citizens.[26] As part of the certification process, DOT not only requires an affidavit of citizenship, but also demands that the applicant state the nationality of all major owners, directors, and officers. The applicant also must identify its primary sources of financing, and the nationality of its major financial backers. When there is a foreign investor involved in the transaction,

[24] 49 USC § 40102 (a) (2).

[25] 49 USC § 40102 (a) (15).

[26] See, e.g., *In the Matter of the Cancellation of the Operating Authority Issued to Westates Airlines, Inc.*, DOT Order 94-12-17 (December 13, 1994).

DOT inquires closely about business, personal, or professional ties between and among the various parties.

Control is reviewed on a case-by-case basis, as ownership percentages do not tell the entire story. DOT has found impermissible foreign control where a foreign entity has the direct power to influence an air carrier's operations and decisions. Substantial equity holdings is one indication of control; as a general rule, DOT is more concerned about a foreign entity having a significant equity position in a carrier than it is about large debt interests.[27] For publicly traded companies, "control" might be judged to reside with a relatively small bloc of stock, if the remaining shares are widely held. The power to control also can be indirect, as where a foreign entity or individual, through his or her relationships, has the ability to exercise a substantial influence over the carrier, despite meeting the nominal criteria of the law.[28] Negative control by foreign entities also raises concerns, as, for example, where a foreign entity has the power to veto major carrier decisions or to liquidate a carrier.[29]

To ensure that it can assess the fitness of carriers on a continuing basis, DOT requires that a carrier advise DOT if the carrier undergoes a major change in operation, if more than 10 percent of its voting stock changes hands, or if there is a major change in personnel at the company.[30] There have been several cases in which DOT has found that a previously certified carrier no longer qualified because of changes in ownership or management structure.[31]

2. Likely proposals for change

The U.S. government almost certainly will receive proposals to liberalize the existing ownership regime within the coming decade. One driving factor is the continued integration of the economies within the European Union, which is creating pressures to establish a unified, liberalized aviation regime within Europe and to seek a new multilateral relationship between Europe and the United States.[32] Recently, the European

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[27] *Application of Discovery Airways, Inc.,* Order 90-2-23 at 5.

[28] See *Trans Borinquen Air, Inc*., DOT Order 2000-4-20 (April 19, 2000).

[29] See, e.g., *Page Avjet Corp.,* Order 83-7-5 at 3, 4.

[30] 14 CFR § 204.2(1), and 14 CFR § 204.5.

[31] For example, *In the Matter of the Cancellation of the Operating Authority Issued to Wrangler Aviation*, DOT Order 93-7-26 (July 15, 1993).

[32] See, for example, "Aviation in Hard Times: Restructuring and Recovery," Michael Whitaker, Vice President for International and Regulatory Affairs, United Airlines; Presentation to the American Bar Association Forum on Air and Space Law, April 3, 2003.

Court of Justice declared illegal several of the provisions of the open-skies agreements between the United States and several EU Member States. The European Commission may be directed to propose a multilateral agreement with the United States. The proposed Transatlantic Common Aviation Area (TAA) is a representative example of the provisions the EU will propose. It includes two possible modes of ownership liberalization:

- Unrestricted airline ownership and the right of establishment among TAA member nations. This policy would permit foreign investors to purchase or form U.S. registered airlines, subject to the same laws and regulations as existing U.S. airlines.[33] Applicants would be certified and regulated under the full range of the laws of the United States. Aircraft would be U.S. or "N" registered. Similarly, U.S. citizens could purchase or form airlines in other TAA member nations.
- The freedom to provide services between any points within the TAA member nations, including two points in a single country (i.e., cabotage)[34] Cabotage permits any carrier certified in member nations to provide domestic service within the boundaries of any member nation. Thus, for example, Lufthansa or British Airways could enter any domestic markets within the U.S.; similarly, U.S. airlines could enter any domestic markets in other TAA member nations.

A third, more limited alternative form of foreign ownership liberalization may be proposed in the next year or two:

- An increase in the current legislated limit on foreign voting ownership percentage from 25 percent to 49 percent.

The near-term pressure for this change could arise from the efforts of the major U.S. carriers to weather their current losses, and to establish financially viable operations. Potential foreign partnerships and sources of capital might prove very attractive for one or more of the airlines. Even within the existing law, there have been several cases in which DOT has permitted non-U.S. ownership of up to 49 percent of the total equity in a U.S. airline, as long as the statutory limits on voting control were followed. For example,

[33] The Transatlantic Common Aviation Area contemplates the elimination of all restrictions on ownership and control for carriers within the Area. For example, U.S. citizens may freely invest in a carrier operating and based in the United Kingdom, just as a British investor could do the same with regard to a carrier operating within the United States.

[34] Under the TAA, carriers may fly between any two points in the Area. This is the case even if that service does not include a point in the carrier's homeland (i.e., a Seventh Freedom service) or, indeed, is operated solely between two points in a foreign country (i.e., a "cabotage" service). Carriers would be free to price their services as they choose, subject only to normal competition laws. Services operated to a point outside the Area, or by a carrier from a nation outside the Area, would continue to be governed by traditional bilateral air service agreements.

when Northwest was in financial jeopardy in the early 1990s, DOT permitted KLM to hold up to 49 percent of Northwest's total equity, based in part on the fact that such equity holding did not confer upon KLM the ability to exercise control over Northwest, and in part on the strength of the liberal nature of the Netherlands-U.S. bilateral air service relationship.[35]

c. A National security risk management framework

U.S. government decisions on these proposed regime changes will require balancing a wide range of economic, political, and national security considerations. The involved federal agencies likely will include the Departments of Transportation, State, Justice (when Antitrust issues arise), and DoD. DoD's responsibility is to ensure that national security needs and considerations are factored into the government's decision making. One obvious national security priority is the need to ensure continued access to necessary commercial airlift through the CRAF program. This section describes a risk management approach that will enable DoD to assess how the possible changes in ownership regimes would affect CRAF.

The risk management framework weighs economic, patriotic, and international political variables. The framework focuses on two principal factors: First, liberalizing foreign investment or foreign entry into U.S. markets may be expected to increase available capital and competition in U.S. markets. As a customer of aviation services, DoD should benefit in peacetime and may benefit in wartime from any such changes that contribute to the economic vitality of the industry. Added competition can be expected to strengthen incentives for efficiencies, cost reductions, and service innovations. On the other hand, DoD must weigh the risks associated with using carriers for CRAF that are more greatly influenced by foreign owners than are existing U.S. airlines. Stronger foreign influence increases the risk that international political developments could create conflicts of interest that undermine an airline's commitments to CRAF.

In practice, the tradeoffs inherent in the risk management framework must be evaluated within the context of specific circumstances. We discuss three specific policy issues that DoD will need to resolve in addressing proposals for liberalizing foreign ownership:

- First, DoD will need to define its position on any specific proposal to change the U.S. government's legislated ownership regime. These proposals may

[35] See DOT Order 91-1-41.

arise in the context of international negotiations, as well as in hearings on any proposed Congressional action to raise or eliminate the ceiling on foreign ownership.

In order to define a DoD position on a change in this law, DoD will need to evaluate the kinds of risk-management provisions that might be adopted to mitigate potential national security risks. Two risk-management provisions are of particular importance:

- Risk-Management Provision A: DoD should evaluate the feasibility of establishing CRAF eligibility criteria that could ensure that participating airlines reliably meet their CRAF commitments under alternative ownership regimes.
- Risk-Management Provision B: DoD should evaluate the feasibility of codifying a national security review and approval process that addresses specific proposals to alter the ownership of U.S. airlines, or to permit the establishment of new, foreign-owned airlines under the right of establishment.

These provisions are discussed in turn. At the end of the section, we discuss the relationship between these provisions and the national security implications of a change in the federal law on foreign ownership.

d. Risk Management Provision A: Eligibility criteria for CRAF participation to ensure reliable commitments

Provision A: DoD should set criteria for CRAF participation that ensure reliable commitments.

CRAF is a contractual agreement, and DoD must be able to rely on participants to meet their obligations when CRAF is activated.

With regard to foreign air carriers, or carriers with strong foreign ownership interests, the Department of Defense must contend with the risk that such carriers' commitments to CRAF could be weakened if they remain subject to the sovereignty, regulatory authority, or influence of another government. On balance, DoD will have more confidence in a commitment from a U.S.-owned airline than one from a foreign-owned airline, or even an airline with a significant fraction of foreign ownership. Just as governments grant or deny over-flight privileges or airport access privileges depending on international political considerations, they could be expected to deny or delay U.S. military use of aircraft owned by airlines under the influence or control of their citizens.

Under current CRAF provisions, there could be limits on the ability of the U.S. government to compel a carrier to comply with a CRAF activation order. Time is of the

essence when CRAF is activated, so only those provisions that contribute in near-real-time to the dependability of the CRAF commitments should carry much weight. Normal legal remedies could prove inadequate, because is not the helpful for DoD to win a judgment six months later from an airline that refused to meet its commitment.

The proposed risk-management approach is to establish eligibility criteria that ensure strong commitments from all CRAF participants. A number of possible eligibility criteria have been suggested to accomplish this[36] (see Table 11); these include the existing requirement that all aircraft committed to CRAF be registered in the U.S., and thus subject to seizure under the Defense Production Act. Moreover, in the event such a carrier were to refuse to supply required aircraft in the event of a CRAF activation, the U.S. government might wish to reserve the right to withdraw a carrier's certification without affording that carrier the protections and processes normally provided for under the Administrative Procedure Act (APA).[37] With the removal of APA protections and, perhaps, a legislative "finding" that refusal to cooperate with a CRAF activation might constitute an emergency that warrants immediate suspension or revocation of that carrier's operating authority, the government would have a potent source of leverage to strengthen CRAF commitments.

Financial incentives also could play an important role in strengthening commitments. These could include a requirement for performance bonds, or heavy financial and legal penalties on the U.S. owners, managers, and directors of CRAF participant airlines for any failure to honor a CRAF activation. Finally, at the inter-governmental level, the United States government also could obtain advance assurances from the homeland governments of CRAF participants that such governments would honor CRAF commitments. For example, the United States might accord enhanced investment privileges only to carriers from NAFTA signatories, members of the EU, and other friendly country groupings.

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[36] An extensive discussion of conditions and risks associated with the CRAF program is presented in Boaz Moselle, James Reitzes, Dorothy Robyn, and John Horn, *The Economic Impact of an EU-US Open Aviation Area*, The Brattle Group, Washington, DC., December 2002. See, especially, Chapter 7.

[37] 5 USC §§ 551, *et. seq*. The APA sets forth, among other things, the circumstances and procedures to which government-issued licenses and permits may be granted or revoked.

Table 11. Eligibility Criteria and CRAF Commitment Risks

Form of Ownership	Ownership conditions that strengthen commitment	Eligibility criteria that could strengthen commitment	Risk Assessment
US Flag (>75%)	U.S. Certification of Airline & Aircraft U.S. Citizenship (patriotism; national identity) Physical presence of owners and assets Defense Production Act		Citizenship, location of officers and assets, and U.S. registration give strong incentives to meet CRAF commitments
US Flag (>51%)	Same as above -- except, greater influence for foreign owners	U.S. citizenship of majority owners U.S. registration of aircraft Performance bonds; other financial incentives National Security treaty commitments	Legal and financial guarantees are equal to those under existing CRAF program; they could be further strengthened by introducing new enforcement mechanisms, financial incentives, and National Security agreements.
US Flag (<50%) (Right of Establishment)	Same as above – except control by foreign owners	Conditions on "Right of Establishment" – U.S. registration of aircraft Performance bonds; other financial incentives National Security treaty commitments	Under the Right of Establishment—Legal and financial guarantees could be strengthened by introducing new enforcement mechanisms, financial incentives, and National Security agreements.
Foreign Flag	Aircraft would not be U.S. registered Majority owners are foreign citizens Aircraft may move in and out of U.S. jurisdiction	Performance bonds; other financial incentives National Security treaty commitments	The U.S. government would retain limited leverage to enforce commitments from foreign-flagged carriers operating in U.S. markets.

The relevance and effectiveness of these eligibility criteria will depend on circumstances, and their implementation will need to be tested on a case-by-case basis. Nevertheless, the assessment summarized in Table 11 suggests that provisions tied to U.S. registration of aircraft and financial incentives could substantially reduce the risks of permitting airlines with significant foreign ownership to participate in the CRAF program. When fully developed, this framework will provide the basis for individual

eligibility determinations, as well as for assessing the size of the eligible pool of aircraft for supporting the CRAF program.

e. Risk Management Provision B: National security review and approval of specific proposals for ownership changes

DoD should insist that it continue its responsibilities to assess the national security implications of airline proposals to increase foreign ownership beyond the current 25 percent level. The purpose of this review should be to ensure that individual (or cumulative) changes in ownership do not undermine the viability of the CRAF program.

DoD's responsibility could be implemented through existing aviation law, which requires airlines proposing ownership changes to be subject to a fitness review process. DoD should insist that this review incorporate national security considerations. In addition, another existing review mechanism is provided under the Exon-Florio Act, which established the Committee on Foreign Investment in the United States (CFIUS) – an inter-agency committee chaired by the Secretary of Treasury that reviews the national security implications of foreign acquisitions. The President can exercise this authority to block a foreign acquisition of a U.S. corporation under certain circumstances.

Provision B: DoD, in conjunction with DOT and DOS, should review and decide on a case-by-case basis whether an increase in foreign ownership would enhance national security.

We examine here possible criteria for performing this review. The criteria focus on the relationship between changes in foreign ownership and the available supply of aircraft that meet the CRAF eligibility criteria described in the preceding section. As we shall see, this depends on the circumstances. Some examples that illustrate the logic are presented in Table 12.

Table 12. Cases Illustrating Market Analyses

Case	CRAF Market Analysis	Comment
1. A CRAF participant airline applies for permission to increase foreign ownership		
a. It continues to meet CRAF eligibility criteria	CRAF fleet unchanged Pool unchanged Number of participants unchanged	If proposed change in ownership retains the airline's CRAF eligibility, then DoD can support the application. Indeed, if the alternative to an increase in foreign ownership were the liquidation of the airline's assets, national security could benefit from the approval
b. It becomes ineligible for CRAF	The CRAF fleet, the pool of eligible aircraft and participants are reduced	If the proposed ownership change makes the airline ineligible: -- DoD may oppose the application if the impact on the CRAF program is too large. -- DoD may accept an application, if the impact on the market is acceptable.
2. A non-CRAF participant airline applies for permission to increase foreign ownership		If an airline is not currently a CRAF participant, the application will have no direct effect on the CRAF fleet or participants.
a. It continues to meet CRAF eligibility criteria	CRAF fleet, pool, number of participants not directly affected	An indirect disincentive could be created if non-CRAF participants face more liberal rules than the CRAF participants. Such an asymmetry needs to be avoided.
b. It becomes ineligible for CRAF	CRAF-eligible pool reduced	
3. A new U.S. Airline formed by "Right of Establishment" with majority foreign ownership		DoD could insist that any grant of "Right of Establishment" requires an airline to meet CRAF eligibility criteria. Otherwise, competition from new airlines could reduce the pool of existing CRAF-eligible aircraft, without providing substitute capabilities.
a. It meets CRAF eligibility criteria	New entry would expand the pool of eligible aircraft and the number of potential participants	
b. It does not meet CRAF eligibility criteria	New entry would not contribute to CRAF, and entrant would compete economically with CRAF participants	
4. A foreign airline enters U.S. markets via Cabotage	New entry could not meet plausible CRAF eligibility criteria. Entrant would compete economically with CRAF participants	DoD would have no direct interest.

The indirect effects of changes in ownership policies also must be evaluated. One point that warrants consideration is the possibility of changes in the desirability/ attractiveness of CRAF participation if foreign ownership of U.S. airlines were to become

widespread. This raises the question of the role of patriotism in a carrier's CRAF participation, versus purely economic incentives. Is it more likely that an airline with U.S. ownership would be more inclined, and an airline with influential foreign ownership less inclined to participate in CRAF? Most U.S. carriers indicate that they participate in CRAF not only out of a sense of patriotism, but also because it is commercially viable. If that is the case, and effective financial incentives for CRAF participation are put into place, then the ownership structure of the carrier may not automatically be a disqualification. If there were concern that the willingness to participate in CRAF might diminish because non-CRAF participants were subjected to less stringent certification requirements than CRAF participants, one of the options that should be considered in the event that U.S. law were amended to grant the right of establishment is to make the certification of such a carrier expressly conditional on sustaining eligibility to participate.

f. Assessment

DoD's position on potential legislative changes in the foreign ownership cap must take into consideration the potential risk-mitigation provisions that could be put into place. For this reason, we do not believe it is possible to make an unconditional recommendation on the first question. Two scenarios are discussed here to illustrate the possibilities.

Scenario 1: We believe DoD could support a change in the legislated ceiling on foreign ownership, provided strong national security risk-mitigation provisions were put into effect. Under this scenario, DoD could set eligibility criteria for CRAF that ensure strong commitments. DoD also could review and approve specific applications for changes in foreign ownership. The Department thus would have the authority to block applications that significantly undermine the CRAF program.

Scenario 2: This scenario envisions the alternative case where DoD would not be able to secure strong risk-mitigation provisions. Without these provisions, increasing the foreign ownership ceiling would be much more difficult to justify from a national security perspective, because there is some risk that foreign ownership could weaken the commitments to CRAF, without any offsetting risk-mitigation provisions.

In summary, the risk-mitigation provisions provide a conceptual approach for managing the CRAF program in an environment where the statutory limitation on foreign ownership has been raised. Establishing eligibility criteria ensure that all CRAF participant airlines provide strong commitments to the program. Establishing a national

security review and approval process for specific applications to increase foreign ownership will ensure that the pool of eligible airlines and aircraft remains adequate to meet DoD needs. Within this framework, the U.S. government can operate with significantly greater flexibility to address changing economic circumstances.

D. A DOD AIRLIFT PROGRAM THAT BALANCES MILITARY AND COMMERCIAL CAPABILITIES

A final set of issues involves DoD's future programmatic decisions on military airlift programs. This section briefly describes two areas of interest raised in our review.

1. Assessing future military airlift investments

Recommendation: Given expected changes in the supply of and DoD's demand for airlift capabilities, DoD should reassess the costs and benefits of alternatives before expanding the C-17 fleet beyond 180 aircraft.

As noted earlier, DoD committed in the FY 2003 program to increase the fleet of C-17s from 120 aircraft to 180 aircraft. Calculations presented in Chapter III demonstrate the implications of this action for wartime CRAF requirements and for the peacetime business base for all-cargo carriers. The last of these 180 aircraft are scheduled for delivery in 2008. In FY 2006, or perhaps earlier, DoD will be faced with the decision of whether to procure additional C-17s. As noted earlier, the Commander of U.S. Transportation Command has proposed expanding the C-17 fleet to 222 aircraft.

In weighing this investment decision, DoD undoubtedly will consider alternative ways to add airlift capacity. The Department has assessed some of these in earlier studies. For example, the C-17 Cost and Operational Effectiveness Analysis (COEA) considered modified commercial aircraft as substitutes for the C-17.[38] Other alternatives suggested during our review included continued reliance on CRAF, creating a CRAF "ready reserve," developing commercial versions of the C-17, and developing a C-141 replacement aircraft.

Given the expected changes in airlift supply conditions and DoD's employment of airlift over the coming decade, we believe that DoD should re-assess alternatives such as these before committing to buying more that the currently planned 180 C-17 aircraft. These alternatives are briefly discussed in turn.

[38] W.L. Greer, *Cost and Operational Effectiveness Analysis of the C-17 Program*, Institute for Defense Analyses, Alexandria, Virginia, R-390, December 1993.

a. Rely on CRAF

DoD plans to rely heavily on CRAF activation to meet requirements for moving troops and for aero-medical evacuation support. The Department could make a parallel commitment to relying on CRAF for meeting cargo needs beyond those met the by the programmed fleet of 180 aircraft. Our calculations suggest that with 180 C-17 aircraft, our CRAF planning target of 25 MTM/D ± 5 would be sufficient to meet DoD's baseline requirement, as well as a scenario involving 15 percent more airlift in support of DoD's transformed logistics concepts. As we have seen, the U.S. airlines are expected to control more than enough long-range aircraft to meet this requirement.

Expanding the C-17 fleet beyond 180 aircraft will drive the CRAF commitment below the target level. Our calculations show, for example, that a fleet of 240 C-17s would necessitate cargo augmentation of only about 13 MTM/D – a level well below the current target and current airline commitments.

b. Institute a "ready reserve" fleet

Over the last year, substantial numbers of B747s have been withdrawn from service as the major airlines have cut capacity and costs. The passenger market for B747s has undergone a permanent decline. Hence, conversion of the aircraft taken out of service by these changes to military passenger or freighter aircraft could provide a relatively inexpensive way to significantly expand available capacity. The costs and benefits of two options should be considered: DoD could purchase these aircraft and place them in a DoD-owned ready reserve fleet. Alternatively, the Department could make arrangements for commercial airlines to buy them and maintain them in a ready reserve fleet. In either case, DoD could rely extensively on commercial crew training and proficiency practices.

In the COEA mentioned above, a combined fleet of B747s and C-17s was found to be an effective alternative, albeit with some limitations for ferrying larger equipment. Given the depressed prices of B747s on the used aircraft market, the potential merits of such a combined fleet should be given close consideration.

c. Develop a C-141 replacement aircraft

Some in DoD believe that the retirement of the C-141 will leave a capability gap that is met by neither the C-30 nor the C-17. If DoD moves to a logistics posture based on intermediate supply bases, then it might be better served by creating a rugged, low-observable intermediate air lifter. This aircraft would be optimized to provide the logistics bridge from the intermediate supply bases to front-line logistics customers. Such a program would be very expensive compared to the other alternatives discussed here, but the added advantages of such a new design in supporting DoD's logistics concepts merit consideration.

d. Lease commercial versions of C-17

A final option is that of creating a commercialized version of the C-17 that would serve commercial markets in peacetime and fly for DoD when needed. A variant of this option may have some merit when DoD's fleet of C-17 aircraft grows to the point that its capacity exceeds DoD's peacetime market.

2. The DoD Flying Hours program

Recommendation: DoD should re-examine the Flying Hours program to identify alternatives that will be cost-effective once the C-17 fleet capacity grows to exceed normal peacetime cargo requirements.

DoD's policies governing the peacetime utilization of military aircraft present related programmatic issues affecting the CRAF program. The existing peacetime Flying Hours program for C-17 aircraft is based on DoD requirements for crew training. The DoD policy is to maintain five crews for each aircraft. To maintain the proficiency of these crews, DoD policy requires that they each fly about 24 hours per month, yielding a total aircraft utilization of about 1420 hours per year.

DoD uses this training time, to the degree possible, to perform cargo-carrying missions. This enables the Department to use the flight time productively and to generate cargo revenues to offset operating costs. Typically, about 60 percent of DoD's peacetime flight hours for the C-17 are programmed to earn revenues. The Air Force directly funds the remaining 40 percent in its training accounts.

We described earlier how DoD's expansion of the C-17 fleet and growing reliance on direct shipments of products from suppliers to DoD end users are working to displace

business currently carried by commercial charter operators. Today, when DoD adds an additional C-17 to the fleet, some of the flying hour cost for this aircraft is offset by reductions in commercial charter expenses. Beyond a fleet of about 125 C-17 aircraft – which will be reached in the next two years – the fleet will grow to the point where military airlift capacity will exceed historical peacetime market needs. Whenever operational tempos return to historical peacetime levels, the available C-17 capacity will exceed peacetime requirements. Any additional C-17s will be unable to earn peacetime revenues. For these aircraft, the DoD will have to bear the entire cost of flying hours through additions to the Air Force training accounts.

For this reason, we believe DoD's review of investment decisions should be accompanied by a review of its Flying Hours program. The Department needs to identify options for managing the Flying Hours program that will remain cost-effective for the larger C-17 fleets. Inevitably, these options entail reducing DoD's total peacetime flight hours by adopting alternative approaches for maintaining crew readiness.

Three basic alternatives suggest the range of possibilities that should be explored in such a review:

a. Substitute simulators and trainers for C-17 flight hours

The most direct approach is simply to scale back the utilization of C-17 aircraft. This would entail the introduction of less expensive means of training using a combination of simulators, training aircraft, and C-17 flight hours. A variant of this option would be to implement a tiered approach to readiness under which some forces would be fully trained to respond quickly, while others would require some preparations before becoming fully mission capable.

b. Place some C-17s in commercial service

The Air Force is exploring the development of a commercial-use version of the C-17 aircraft. Taken in isolation, this program does not appear to be competitive without some government subsidization. However, when viewed as a means of offsetting the costs of the Flying Hours program by capturing some commercial business, this program could make financial sense for DoD. Therefore, this option merits consideration in assessing future program alternatives.

c. Substitute commercial B747s with commercially trained crews for additional C-17s

As noted above, the introduction of a B747 ready reserve would permit the use of commercial training capabilities for maintaining crew readiness. Hence, DoD could sustain an adequate level of crew readiness without requiring high rates of peacetime utilization of these aircraft.

V. NEXT STEPS

Our review finds that the fundamental conditions for a win-win partnership between DoD and the U.S. airline industry will continue through the remainder of this decade. On the supply side, the U.S. airlines will experience considerable turmoil, but they nevertheless will continue to control a huge fleet of long-range aircraft. On the demand side, Defense Department war plans continue to count heavily on support from commercial aviation. The operative question is, "How will DoD and the airlines choose to manage this partnership?"

Our recommended initiatives provide a framework for adapting the CRAF program to meet several major challenges. The detailed work of defining specific actions will take time and considerable consultation among industry and government officials. Fortunately, the CRAF program is working today; thus, some time is available to consult and begin to formulate the needed actions. However, action will be required in the next two to five years, so work could profitably be started now in all four areas.

Appendix A

ALTERNATIVES TO SUSTAIN THE CIVIL RESERVE AIR FLEET (CRAF)

Robert Agnew
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Larry Knickerbocker

Morten Beyer & Agnew

A. BACKGROUND

Our nation and its commercial aviation industry are never isolated from global developments. Today, the United States and it's allies are engaged in combating international terrorism which on September 11, 2001 turned US commercial airliners into destructive weapons. The impact of these events on the US economy and civil aviation industry has been immense. The threat of international terrorist acts against the US is not only impacting our national economy, but has also has undermined the stability and financial health of the US civil aviation industry.

Nevertheless, today's National Military Strategy continues to rely on our ability to rapidly mobilize our forces over intercontinental distances to meet threats from hostile nations, rogue states and global terrorist organizations. Air mobility is the primary instrument that allows the United States to use our military power to respond with the capability to dominate an opponent across the entire range of military operations. As our forces are currently structured, our ability to rapidly project dominating power worldwide depends on continued access to long range civil airlift capability through an expansion of peacetime charter activity or, for larger operations, the "call up" of civil aviation assets through the contractual procedures of the Civil Reserve Air Fleet.

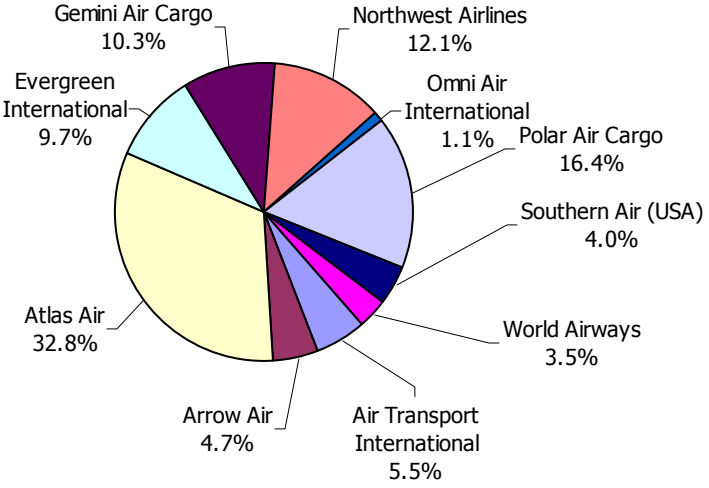
The Civil Reserve Air Fleet (CRAF) is approved by the President of the United States through a 1987 National Security Decision Directive on National Airlift Policy (NSDD-280), which institutionalizes the concept that airlift capability will be provided by both military and commercial air carrier resources. The CRAF program is the responsibility of the US Transportation Command (USTRANSCOM) whose mission is "to provide air, land and sea transportation for the Department of Defense both in time of peace and time of war". However, the CRAF program is contractually managed by the Air Force component, the Air Mobility Command, the combat component responsible for operating the military transport and tanker fleet. The capability of CRAF should can be viewed my mission or as a reformation combination of the wherewithal of its component parts– the organization, the aircraft and flight crews – to meet military requirements.

The CRAF program is organized into segments based on the capability of their aircraft – domestic, short-range international, aero medical and the militarily significant Long Range International segment. At the present time, the CRAF Long Range International Segment relies on eleven (11) US certificated airlines with six hundred and eighty five (685) over water capable aircraft.39 When fully mobilized, contingency plans call for approximately 90 percent of the troops, and nearly 50 percent of the air cargo movements to be moved by these US airlines with authority to operate internationally. A special segment of the CRAF provides long-range aeromedical evacuation capability using forty-six (46) Boeing 767 Extended Range aircraft.

[39] Civil Reserve Air Fleet Capability Summary, HQAMC, 1Oct 02.

Figure 1. Cargo Airlines – Long Range International (LRI)

Current CRAF Participation



Potential CRAF Participation

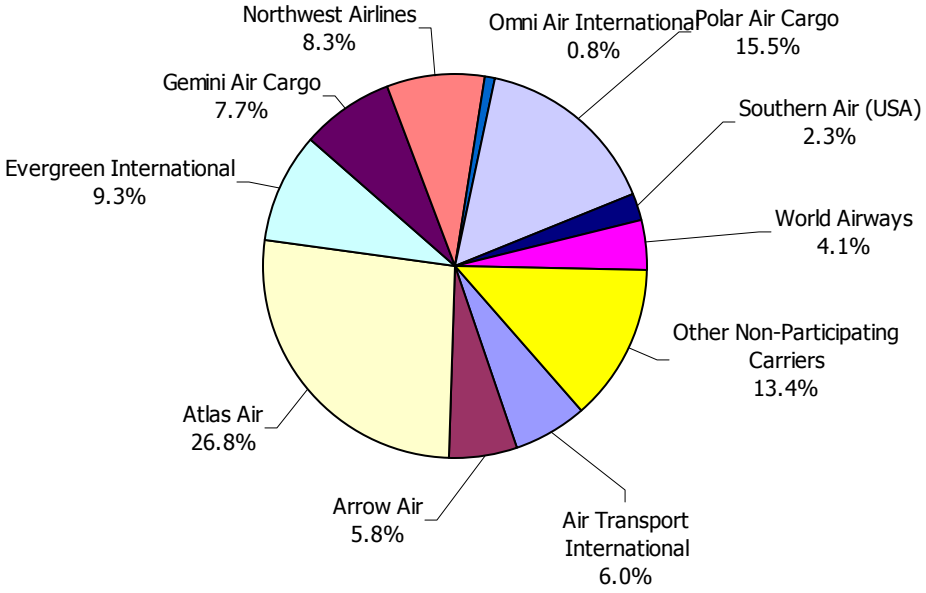
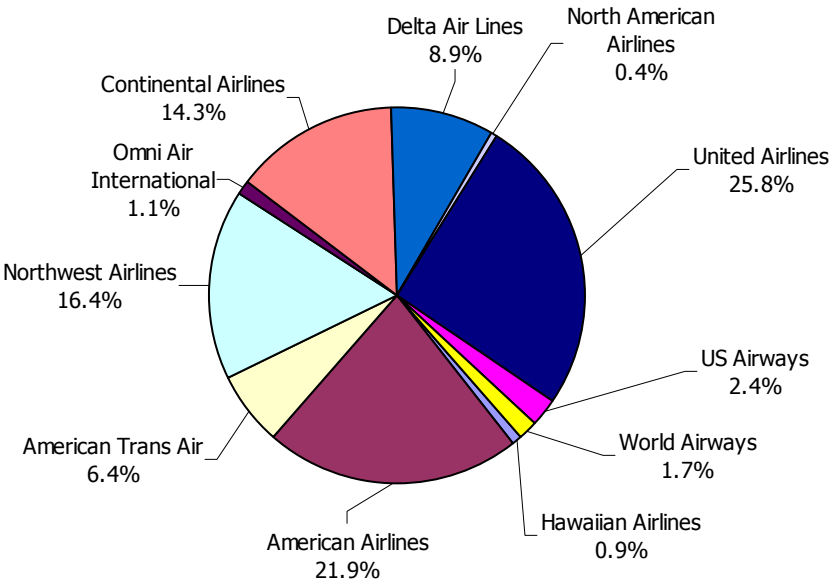


Figure 2. Passenger Airlines – Long Range International

Current CRAF Participation



Potential CRAF Participation

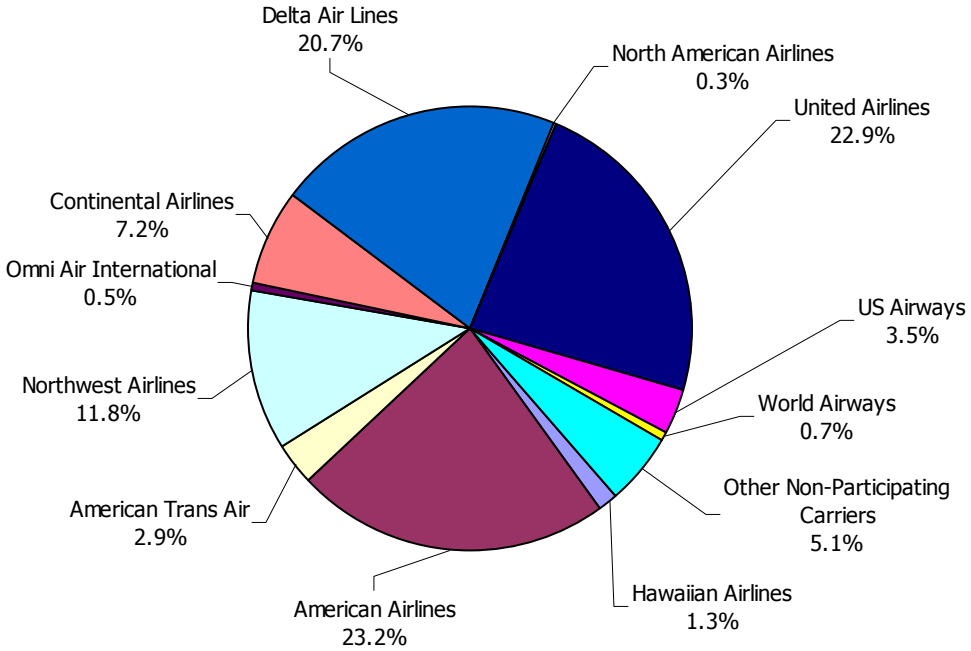
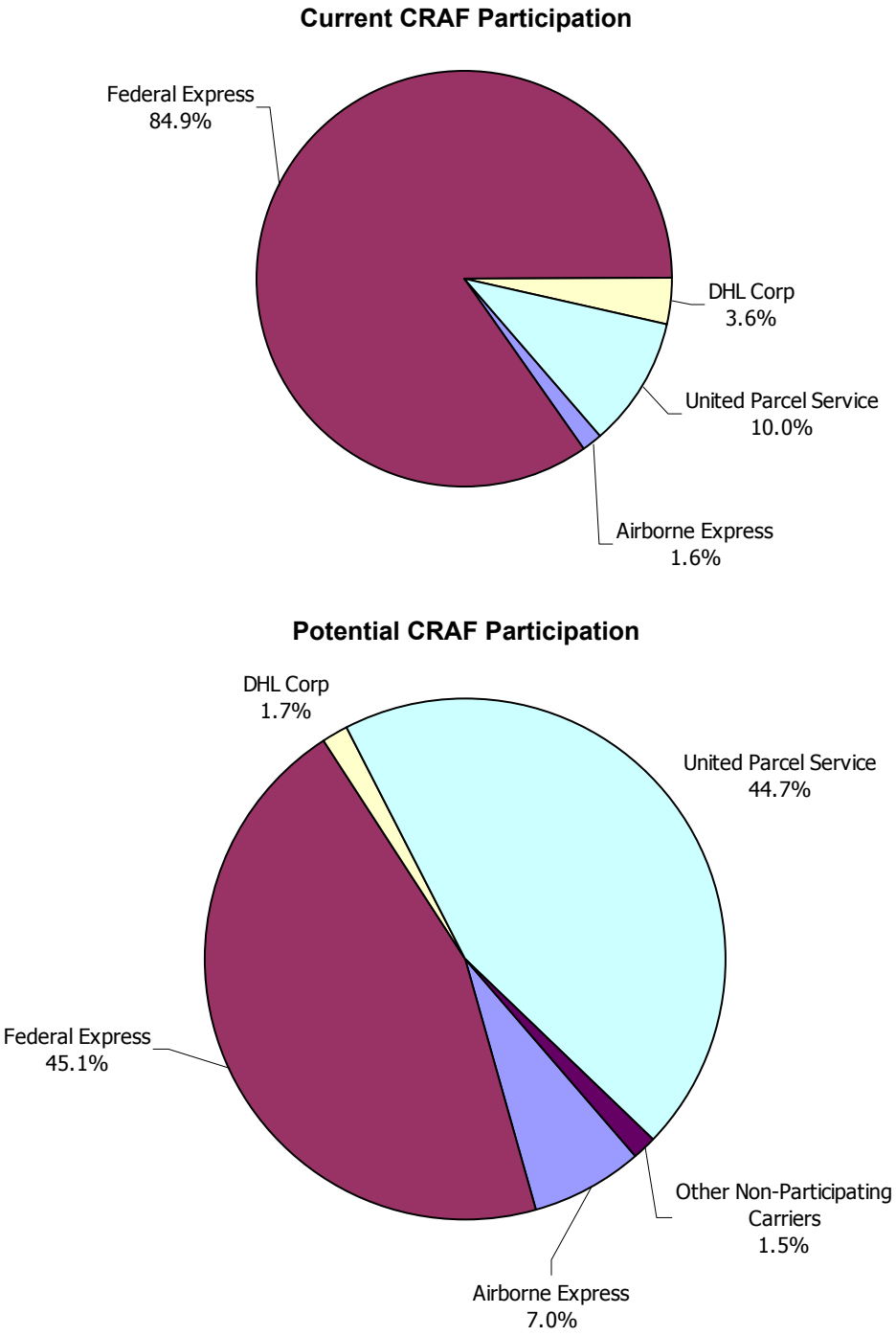


Figure 3. Integrated Carriers – Long Range International



The CRAF Long Range International fleet is operated by a minimum of 2,900 US citizen pilots that are not reserve members of the armed forces. Collective bargaining units negotiate pay, work rules and working conditions with their respective airlines and represent virtually all of the pilots in CRAF. In all cases, the Railway Labor Act, which provides procedures for avoiding the interruption of air commerce, governs procedures for resolution or an individual airline over contract disputes about pay, work rules, or working conditions.

Figure 4. Flight Crews per Aircraft of Some CRAF Carriers

Airline	Pilots	Pilots/Aircraft
American	11,567	15.9
Amr Trans Air	1,021	18.2
Continental	5,277	14.0
Delta	10,037	16.7
Northwest	6,439	14.8
United	10,682	17.4
US Airways	5,941	14.2
Airborne	890	7.5
Atlas	742	20
DHL	511	14.2
FedEx	3,843	10.6
UPS	2,369	9.7

Note: Depicted during period of industry financial health – Current 6/01 Source: Air Inc.

In order to evaluate the present day civil air/military air policies and contracts, it important to have an understanding of the development of the nations civil aviation industry and military transport capability – and their how their respective roles during peace and war have evolved.

B. HISTORY: TRADITION OF GOVERNMENT SUPPORT OF THE INDUSTRY DEVELOPMENT

For more than eighty years, it has been the policy of the United States Government to promote and assist in the development of commercial aviation. At the end of World War I, the postal service used surplus aircraft to test the concept of airmail routes. By the mid 1920s, the Post Office mail fleet was flying 2.5 million miles and delivering 14 million letters annually. Because the US Post Office had traditionally contracted with private companies for the transportation of mail, the government had no intention of continuing airmail service on its own. Once the feasibility of airmail was firmly established, and airline facilities were in place, the government moved to transfer airmail service to the private sector by way of competitive bids.

The legislative vehicle for the move to using airmail contractors was the 1925 Contract Air Mail Act, commonly referred to as the Kelly Act. It was the first major legislative step toward the creation of a private U.S. airline industry. Airlines such as Pan Am were founded to move mail between Key West and Havana. Merging existing companies to win contracts to fly the mail also resulted in the formation Eastern Airlines, United, American and TWA.

Within a year, the Congress amended the Kelly Act to change the method of compensation for airmail services. Instead of paying carriers a percentage of the postage paid, the government would pay them according to the weight of the mail. This simplified payments, and it proved highly advantageous to the carriers, which collected $48 million (approximately a half a billion in today's dollars) from the government for the carriage of mail between 1926 and 1931.

In 1930, the Postmaster General Brown pushed for legislation that would have another major impact on the development of commercial aviation. Known as the Watres Act it authorized the Post Office to enter into longer-term contracts for airmail, with rates based on space, or volume, rather than weight. In addition, the act authorized the Post Office to consolidate airmail routes where it was in the national interest to do so. It was believed the changes would promote larger, stronger airlines as well as more coast-to-coast and nighttime service.

Immediately after Congress approved the act, Postmaster General Brown held a series of meetings in Washington to discuss the new contracts. The meetings were later dubbed the "spoils conference" because Brown gave them little publicity and invited only a handful of people from the larger airlines. He designated three transcontinental mail routes and made it clear that he wanted only one company operating each service rather than a number of small airlines handing the mail off to one another across the United States. Brown got what he wanted – three large airlines (American, TWA and United) to transport the mail coast-to-coast – but his actions also brought political trouble that resulted in major changes to the system two years later.

1. Small Carrier Protests

Following of 1932 Presidential Election, some of the smaller airlines complained that Brown had unfairly denied them airmail contracts. One reporter discovered that a major contract had been awarded to an airline whose bid was three times higher than a rival bid from a smaller airline. Congressional hearings followed (chaired by Sen. Hugo Black of Alabama) and by 1934 the scandal had reached such proportions as to prompt President Franklin Roosevelt to cancel all mail contracts and turn mail deliveries over to the Army.

The decision was a mistake. The Army pilots were unfamiliar with the mail routes, and the weather at the time they took over the deliveries (February, 1934) was terrible. There were a number of accidents as the pilots flew practice runs and began carrying the mail, leading to newspaper headlines that forced President Roosevelt to retreat from his plan only a month after he had turned the mail over to the Army.

By means of the Air Mail Act of 1934, the government once again tendered the mail to the private sector, but it did so under a new set of rules that would have a significant impact on

the industry. Bidding was structured to be more competitive, and former contract holders were not allowed to bid at all – these airlines changed their names and appointed new executives. The result was a more even distribution of the government's mail business, and lower mail rates that forced airlines, and aircraft manufacturers, to pay more attention to the development of the passenger side of the business.

In another major change, the government forced the dismantling of the vertical holding companies common up to that time in the industry, sending aircraft manufacturers and airline operators (most notably Boeing, Pratt & Whitney, and United Airlines) their separate ways.

2. Airlift During World War II

Civil Aviation had an enormous impact on the course of World War II and the war had just as big of an impact on air transportation. There were fewer than 300 air transports in the United States when Hitler marched into Poland in 1939. During the war aircraft production had become the world's leading manufacturing industry. By the end of the war, over 40 U.S. aircraft manufacturers were producing 50,000 planes a year and the US had built more than 300,000 aircraft.

Although the US War Department had envisioned operating a worldwide air transportation system, it lacked the necessary resources, so it proposed augmenting the military transports with civilian airlines. For example, a Pan American Airways subsidiary, agreed to fly ferry missions to Africa via the South Atlantic. This arrangement tapped Pan American's rich experience gained during the previous twelve years of operations in Latin America and inextricably linked military airlift to civilian airlines.

Eventually, every major US airline provided some type of contract service worldwide. Although the War Department had envisioned a fully militarized organization as the ideal, the use of contract services continued until the end of the war.

During the war, the original agreements allowed the government to purchase the airlines' aircraft and equipment and then operate them using civilian pilots and support personnel. These contracts also often called for specific support services. For example, TWA and Pan American were required to provide scheduled passenger and cargo service between San Francisco and Hawaii, but were also directed in their contract to make runway improvements and to construct housing at airfields along the routes under its jurisdiction.

As the War Progressed, the War Department gradually adopted an "on-call" contract strategy in 1943. This type of contracting bound the airlines to render any service to the government within the general limits of the carrier's capabilities. By the end of 1944, a completely mobilized domestic airline system greatly improved the flexibility and responsiveness for the war effort. For example, it allowed aircraft and personnel to be allocated as needed, enabled the establishment of an integrated communications system, and standardized aircraft types that enhanced training, scheduling, and maintenance operations.

It's important to note that the concerns about using the civil industry in high-risk areas emerged during this era. General Hap Arnold believed that "the Army Air Corps had to provide

transport operations run by military personnel, rather than by civilians under contract, on routes that enter combat areas or are likely to become combat areas." The military's use of the civil carriers had been one of necessity, but by now the military was reliant on civil carriers for global mobility.

3. Defense Reliance On A Strong Airline Industry

After World War II, the airlines hired large numbers of people, ordered new airplanes and extended their routes— and because of over expansion their financial performance was dismal. By the end of June 1947, the major US carriers were all headed toward bankruptcy. Their viability to respond and augment the military was questionable. In 1947, President Harry Truman established a temporary Air Policy Commission "to make an objective inquiry into national aviation policies and problems," and to assist in formulating an integrated national aviation policy. Known as the Finletter Commission, it interviewed the airlift experts of the period.

Finletter's Commission revealed that the nation's airlift would be unable to meet wartime needs and stated, "We must increase our commercial fleet." The report also disclosed that the military planned to "take over, as they did in World War Il, as much of the civilian lines, domestic and international, as circumstances permit" and suggested the preparation of prior agreements to specify what equipment and services the airlines would furnish. The final report, submitted in December, 1947, stated, "As potential military auxiliary, the airlines must be kept strong and healthy." The Finletter Commission added, "They are not in such a condition at the present time."

Three years after the Finletter commission, a wartime airlift requirement study called the Douglas Commission recommended establishing a three-tiered reserve of over water capable (four-engine) transports in the civilian airlines. The Douglas Commission admitted that the required military modifications, (over water capability) making the aircraft heavier, would increase the operating expenses of the airlines. The commission suggested that the military should pay the calculated difference. This report in 1951 became the basis for organizing the commercial carriers to augment the military airlift system – the birth of CRAF.

4. National Debate

As the airlift missions of the Korean operations wound down and the Cold War continued, the military found itself embroiled in a crucial debate with segments of the commercial aviation industry and members of Congress over the role of military air transport in peace and in war. To many critics, the military's airlift system simply appeared more appropriate for private enterprise, especially when military pilots flew the same routes used by the commercial carriers. Initially, the debates were driven by the desire to achieve sound government fiscal management practices.

Nevertheless, during these disputes Air Transport Association (ATA) President Stuart Tipton presented a plan for a national airlift program. He advocated a force of military and civil aircraft capable of satisfying war requirements. His plan essentially limited the military to specialized transport for outsize, or exceptionally heavy cargo, unusual security measures, or direct support of tactical combat units.

Department of Defense (DoD) rebuttals were centered on flexible, responsive airlift. Military air transport forces had to achieve a high state of trained readiness as well as to maintain peacetime operations to ensure an instant response capability. These forces required the means to expand operations to meet the projected wartime utilization rate. Furthermore, the military airlift system was under pressure to reduce its peacetime airlift costs.

This DoD viewed civil air transport resources as augmentative and planned to use them in peacetime to the maximum practical extent, as long as this policy was consistent with airlift requirements and the efficient cost effective employment of military resources. Air Force Deputy Chief of Staff Curtis Lemay candidly told Congress, "The military has core airlift needs of crucial importance at the outset of emergencies that reliance for anything but a seasoned, properly equipped, disciplined military force is a folly.... Where the security of the free world is suddenly threatened, we cannot wait for the acquisition of commercial airlift."

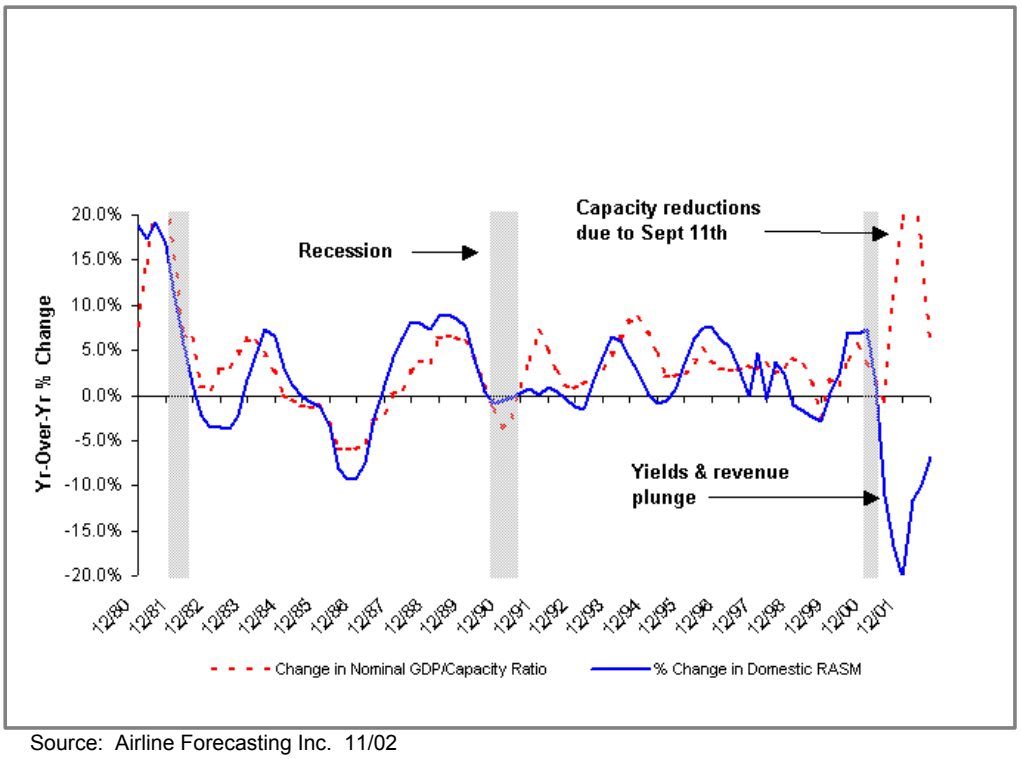
The civil carriers were motivated by their concerns the building of an airlift force that "overlapped" the capability of industry. Congressman Holifield advised the House Defense Appropriations subcommittee to make recommendations on the basis of what would best serve national defense. These recommendations laid the groundwork for the military to concentrate on the outsize or unusual missions or hard-core" requirements, while leaving the passenger and conventional cargo business to the commercial carriers.

This important national debate caused the military and commercial carriers to regard each other as essential for national defense. The airlift lesson learned during World War II, and subsequently confirmed during Korean Conflict is that the nation could not maintain enough military airlift capability to meet all of DoD needs. This shortcoming provided the catalyst for and establishment of, the Civil Reserve Air Fleet (CRAF), a partnership between military and civilian airlift.

C. CRAF PROGRAM POLICY IS WORKING

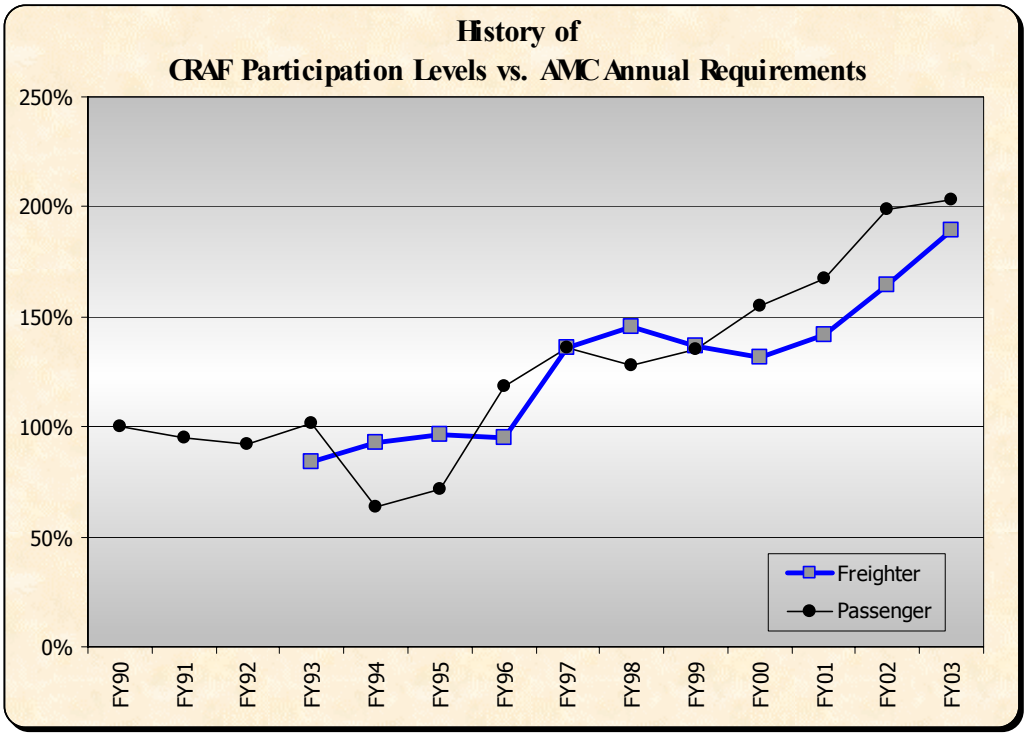
Looking back to 1990, in all but the two years following Desert Storm, the CRAF Program has attracted capability in excess of the needs of DoD planners. Presumably, the increase in program subscription can be attributed to the program adjustments made following Desert Storm.

Figure 5. Fragile Financial Condition of the Industry
Year over Year Capacity Change



Source: Airline Forecasting Inc. 11/02

Figure 6. CRAF Participation Levels vs. Annual Requirements



D. OWNERSHIP AND CONTROL

1. Historical Background

A. Chicago Convention. While the Convention established the basic principles of each country's exclusive sovereignty over its airspace (Article 1) and the right of each country to reserve cabotage for each country's national carriers (Article 7), the right of a country to establish ownership and control restrictions is only inferred as a consequence of the aircraft nationality provision (Article 17). Absent the grant of multilateral economic rights in the Chicago Convention, those economic rights, and the right to establish ownership and control restrictions, were left to the terms of bilateral agreements between aviation trading partners.

B. Bilateral Agreements. Commencing with the 1946 Bermuda I agreement between the U.S. and U.K. (and based on the nationality clauses of the International Air Services Transit Agreement), all U.S. bilateral air services agreements and most such agreements between other countries in the world contain ownership and control provisions. The current U.S. standard "open skies" agreement specifies (Article 3.2.a.) that the U.S. will grant authority to an airline designated by the other country party to such an agreement provided that "substantial ownership and effective control of that airline are vested in the Party designating the airline, nationals of that party, or both," and that the U.S. (Article 4.1.a.) may revoke, suspend or limit the operating authorizations or technical permissions of an airline designated by the other country party to such an agreement where "substantial ownership and effective control of that airline are not vested in the other Party, the Party's nationals, or both." These authorization and revocation rights are reciprocal in the bilateral agreements.

C. National laws and policies. As a consequence of the bilateral air services agreement structure, the U.S. and many other countries of the world have enacted laws and policies that specify the ownership and control criteria for their respective airlines. Such laws and policies often have been established concurrently with laws and policies that specify that domestic transportation (cabotage) may only be operated by airlines of the country enacting such laws.

2. U.S. Laws And Policies

A. The basic U.S. ownership and control provisions are contained in the Transportation Code (Title 49 of the U.S. Code). An "air carrier" authorized to provide domestic U.S., as well as international air transportation is defined to mean a "citizen of the United States." (Section 40102(a)(2).) A "citizen of the United States" is further defined to mean "an individual who is a citizen of the United States; a partnership each of whose partners is an individual who is a citizen of the United States; or…a corporation or association organized under the laws of the United States or a State, the District of Columbia, or a territory or possession of the United States, of which the president and at least two-thirds of the board of directors and other managing officers are citizens of the United States, and in which at least 75 percent of the voting interest is owned or

controlled by persons that are citizens of the United States." (Section 40102(a)(15).) "Foreign air carriers" are defined to mean "a person, not a citizen of the United States…." (Section 40102(a)(21).) Cabotage is limited to U.S. air carriers. (Sections 41102(a) and 41103(a).) U.S. citizenship requirements were first enacted in the Air Commerce Act of 1926 (based on national defense considerations), with those requirements subsequently amended by the Civil Aeronautics Act of 1938 and the Federal Aviation Act of 1958 (now codified in the Transportation Code cited above).

B. Department of Transportation U.S. carrier ownership policies. As the agency required by law to grant operating authority (a certificate of public convenience and necessity) to U.S. carriers, DOT has established both "ownership" requirements and "control" requirements, and DOT makes its citizenship decisions on a case-by-case basis. With respect to "ownership," all sources of foreign investment are aggregated and total foreign ownership may not exceed 25 percent of the airline's voting securities. Additionally, in determining whether the ownership requirements are satisfied, a foreign owned or controlled U.S. entity typically will be classified as a non-U.S. citizen. Thus, under this policy, it is not possible for a foreign citizen to use a U.S. subsidiary or affiliate to acquire more than 25 percent of the voting interest of U.S. air carrier.

C. Department of Transportation U.S. carrier control policies. In addition to the numerical requirements of the Transportation Code, DOT has consistently required that a U.S. carrier be under the "actual control" of U.S. citizens. This "control" test looks "beyond the bare technical requirements" of the Transportation Code to see "if a foreign citizen has the power - either directly or indirectly - to influence the directors, officers or stockholders [of a U.S. carrier]." In examining this issued, DOT has "found control to embrace every form of control and to include negative as well as positive influence" and has "recognized that a dominating influence may be exercised in ways other than through a vote." (DOT Order 83-7-5, pp. 2-3, (1983).) Thus, DOT may undertake a broad examination of all the facts and circumstances of possible foreign influence and control. Important among such "control" factors is foreign ownership of non-voting stock in a U.S. carrier. Since 1991, DOT generally has followed a policy of allowing a non-U.S. citizen entity or person to own up to 49 percent of the equity of a U.S. carrier, so long as (a) no more than 25 percent of the voting interest in the carrier is owned by non-U.S. citizens and (b) so long as U.S. citizens are in actual control of the carrier. (DOT Order 91-1-41 (1991), approving up to 49 percent non-U.S. citizen ownership of Northwest Airlines.) Although DOT generally has found the ownership of such amounts of non-voting stock by foreign citizens to be consistent with the Transportation Code's requirements, the existence of other business or financial ties between the U.S. air carrier and the foreign shareholder (such as a code-sharing arrangement or marketing alliance between the two entities, loans advanced by the foreign shareholder, or a strong customer relationship) could prompt DOT to impose additional requirements on the parties or to otherwise limit the amount of foreign ownership that will be permitted.

D. Challenges to DOT decisions on U.S. carrier ownership and control. While most DOT decisions focusing on U.S. carrier ownership and control have been prompted by DOT

itself, either in the context of an initial application for a certificate of public convenience and necessity, or the continuing requirement of U.S. carriers that they meet the necessary legal requirements to hold a certificate, some challenges have been made against the DOT finding of ownership and control. The most important recent such challenge involves the claims of Federal Express and UPS that DHL Airways is controlled by foreign nationals, including Germany's Deutsche Post. In rejecting that challenge in 2001, DOT stated it would continue to examine the citizenship of DHL Airways, and on May 1, 2002 DOT informed DHL Airways that it continues to satisfy the statutory citizenship requirements applicable to U.S. carriers. In August 2002 Federal Express and UPS again requested DOT to conduct a public inquiry of the ownership and control of DHL Airways.

E. Department of Transportation foreign air carrier ownership and control policies. DOT also is the U.S. agency required by law to grant operating authority (a foreign air carrier permit, or exemption authority) to foreign air carriers. The U.S. Transportation Code contains no numerical definitions of ownership and control for foreign air carriers. Generally, DOT considers the designation of a foreign air carrier by that carrier's government, pursuant to a bilateral air services agreement, as sufficient evidence that such carrier is substantial owned and effectively controlled by the designating country or nationals of that country. In addition, DOT has in various instances waived the bilateral requirement of ownership and control by foreign nationals of a foreign air carrier, if DOT determines the waiver is in the public interest. DOT also has recognized the multinational ownership and control of certain carriers (for example, Gulf Air, SAS and Air Afrique).

3. Recent Developments Potentially Affecting U.S. Ownership and Control Laws And Policies

A. Although most nations of the world continue to adhere to ownership and control restrictions on their own air carriers as well as foreign air carriers, the issue has been the subject of various debates and studies in the past decade, including those undertaken by ICAO, IATA, the OECD, the U.S. National Commission to Ensure a Strong Competitive Airline Industry, the European Comite des Sages for Air Transport, the U.S. Transportation Research Board, and the American Bar Association Air and Space Forum. The most significant developments from the U.S. standpoint are the Asia-Pacific Economic Cooperation forum's multilateral "open skies" agreement and actions within the European Union relative to ownership and control.

B. The APEC multilateral air services agreement was signed on May 1, 2000, with the U.S., Brunei, Chile, New Zealand and Singapore as parties. (Peru and Samoa have subsequently filed instruments of accession to the agreement.) While the APEC multilateral agreement is generally identical to most provisions of the standard U.S. bilateral "open skies" agreement, the ownership and control provision of the APEC agreement is less restrictive. Specifically, it does require the "substantial ownership" of a designated carrier by the designating country or nationals of that country. Rather, the requirements are that (a) "effective control of [the designated airline]…is vested in the

designating Party, its nationals, or both" and (b) "the airline is incorporated in and has its principal place of business in the territory of the Party designating the airline." (Articles 3.2.a., 3.2.b., 4.1.a. and 4.1.b.) However, these provisions may be overridden in the following circumstance: "a Party need not grant authorizations and permissions to an airline designated by another Party if the Party receiving the designation determines that substantial ownership is vested in its nationals." (Article 3.3.) Within days of signing the APEC agreement, DOT, under pressure from U.S. carrier pilot labor unions, issued an order proposing that airlines from the other signatory countries inform DOT 30 days in advance of any proposed change in excess of 5 percent of the ownership of their voting stock. Faced with strong opposition from the affected foreign airlines, the other signatory countries, and Federal Express, UPS and United in the U.S., DOT reached a compromise on the reporting requirement; namely, (a) reporting is required only when U.S. nationals are the shareholders, (b) the transaction must involve 20 percent or more of the foreign carrier's stock, with the total held by U.S. nationals equal to 40 percent or more of the involved stock, and (c) reporting must occur 30 days after any transaction meeting the requirements of (a) and (b).

C. With the creation of the European Union-wide single aviation market through the 1993 so-called "Third Package" of EU regulations, licensing of the airlines of EU member countries became standardized. Council Regulation 2407/92 (1992 O.J. (L 240), 1) established an EU ownership system to replace the previous national ownership and control laws and policies. Thus, to obtain an EU air carrier operating license, the applicant must meet four requirements: (a) the principal place of business of the airline must be located in the licensing EU member country; (b) the main occupation of the carrier must be air transportation; (c) the holder of the license must be owned and continue to be owned directly or through a majority ownership by EU nationals; and (d) the holder of the license must at all times be effectively controlled by such EU nationals. With respect to ownership, the European Commission established that majority ownership exists if at least 50 percent plus one share of the airline's equity (voting and non-voting) is owned by EU nationals. With respect to control, the European Commission and the relevant EU regulations take a similar approach as that of DOT, requiring, after examination of all the facts, that "effective control" be in the hands of EU nationals. The EU regulations do not govern ownership and control of non-EU carriers and those remain subject to bilateral aviation agreements between EU member countries and non-EU countries. Two factors may alter that situation. (a) First, with the failure of the European Commission to obtain authority from EU member countries to negotiate aviation agreements on behalf of the EU, the Commission commenced action in the European Court of Justice (ECJ) against seven European countries which had signed "open skies" agreements with the U.S., plus the U.K., contending the agreements were incompatible with European law. A decision by the ECJ was issued in the case on November 5, 2002. While not upholding the exclusive right of the European Commission to conduct aviation external relations for the EU, the ECJ found several provisions of the challenged bilaterals incompatible with EU law, including the ownership and control provisions in those bilaterals. (b) Second, as part of the debate over EU external relations, the Association of European Airlines has proposed, and the European Commission has endorsed, the concept of a Transatlantic Common Aviation Area (TCAA), which would replace the existing bilateral air

services agreements between the U.S. and individual EU member countries. The proposal envisions an EU-type ownership and control concept, allowing airlines to operate within the TCAA if they are majority owned and controlled by nationals of the parties to the TCAA or their respective governments.

4. Factors To Be Considered Relative To Ownership And Control Of Air Carriers Participating In The CRAF Program

A. U.S. Laws. The ownership and control provisions of the Transportation Code, the prohibition on cabotage operations by airlines not owned and controlled by U.S. citizens, and the Fly America Act all relate to the issue of participation in the CRAF program by carriers not owned and controlled by U.S. citizens. Given the wide-spread support for these laws among U.S. airlines, U.S. airline labor unions, and U.S. political leaders, any modification of the laws to address expanded CRAF participation would likely be under one or more of three scenarios: (a) a multilateral agreement entered into by the U.S., such as that envisioned for the Transatlantic Common Aviation Area, which would allow airline ownership by nationals of any party to the multilateral agreement; (b) an "experimental" expansion of the CRAF program to airlines from a particular region with which the U.S. has a multilateral military relationship, such as Europe/NATO; and (c) utilization of foreign air carrier members of alliances in which U.S. carriers participate, subject to conditions imposed on both the U.S. carrier and foreign carrier members of the alliance.

B. Bilateral and multilateral relationships. Proposals for revisions in the U.S. ownership and control law to **encourage greater participation in U.S. "open skies" agreements have not been necessary for the** success of that U.S. initiative, given the incentive in such agreements for access to the U.S. market. Thus, a multilateral relationship offers greater opportunity for changes in the ownership and control law and CRAF participation. The most likely opportunity relates to the U.S.-Europe aviation relationship, for several reasons: (a) the decision of the European Court of Justice finding the ownership and control provisions of U.S.-European country bilateral air services agreements inconsistent with EU law may well force consideration by the U.S. and Europe of a substitute provision; (b) the Court's decision also may force an accommodation between the European Commission and the EU member countries allowing some type of Europe-wide negotiating authority for the Commission, particularly with respect to a possible multilateral agreement with the U.S.; and (c) the further consolidation of international airline alliances, with three global alliances involving all major U.S. and European carriers, is likely to require aviation policy makers in both the U.S. and Europe to view the aviation relationship based on competition between alliances in the U.S.- Europe market rather than competition between specific airlines in bilateral markets.

C. DOT authority to condition air carrier participation in CRAF. In the event U.S. carriers were allowed to be owned and controlled by non-U.S. citizens, DOT could be authorized to impose conditions on the U.S. carrier's authority requiring such carrier's participation in the CRAF program. With respect to foreign air carriers, precedents already exist for DOT expanded authority to impose conditions on U.S. and foreign air carriers, in the

event foreign air carriers are allowed to participate in the CRAF program. The code-share policies of DoD, DOT and the FAA already require U.S. carrier safety audits and certification for foreign air carrier partners in U.S. carrier airline alliances. Similar policies could be instituted for U.S. carriers to monitor and certify to DoD compliance by foreign air carrier partners with all elements of CRAF participation. For foreign air carriers participating in the CRAF program, DOT could condition such carriers' operating rights to the U.S. to ensure participation in the CRAF program in the event of a national emergency. DOT also could condition the authority of a foreign air carrier participating in the CRAF program to ensure all necessary personnel and security measures in connection with such participation.

5. Possible Options For DoD Use Of Foreign Controlled Air Carriers In The CRAF Program

A. U.S. carrier with foreign ownership and control.
--Revised U.S. ownership and control and cabotage laws to allow foreign ownership and control.
--Revised bilateral or multilateral agreements to allow reciprocal ownership and control by nationals of countries party to the agreement.
--Restrictions on U.S. carrier's certificate to require CRAF participation as condition of economic authority and to ensure compliance with CRAF program elements and security.

B. Foreign carrier with foreign ownership and control.
--Revised Fly America Act to allow foreign air carrier participation in CRAF program.
--Restrictions on foreign air carrier's authority to require CRAF participation as condition of authority and to ensure compliance with CRAF program elements and security.

C. Foreign carrier with U.S. ownership and control.
--Revised Fly America Act to allow foreign air carrier participation in CRAF program.
--Waive applicable bilateral ownership and control restrictions to allow U.S. ownership and control.
--Restrictions on U.S. owners to require CRAF participation as condition of U.S. ownership and control of foreign air carrier.
--Restrictions on foreign air carrier's authority to require CRAF participation as condition of authority and to ensure compliance with CRAF program elements and security.

D. Foreign carrier as part of alliance partnership dominated by U.S. carrier.
--Revised Fly America Act to allow foreign air carrier participation in CRAF program.
--Requirements imposed on U.S. carrier partner for such carrier to ensure foreign carrier compliance with CRAF program elements and security.
--Restrictions on foreign air carrier's authority to require CRAF participation as condition of authority and to ensure compliance with CRAF program elements and security.

E. U.S. carrier as part of alliance partnership dominated by foreign carrier.
--No revisions in U.S. law.

E. DoD SCENARIOS USING FOREIGN AIR CARRIER LIFT

1. Commercial Alliances

Major U.S. carriers (United, American, Delta, Northwest, and Continental) have extensive alliance networks with carriers in Europe and Asia pursuant to which the U.S. carriers and foreign carrier partners code-share on each other's services. Of relevance to DoD's requirements, U.S. carriers code-share on a number of Transatlantic routes between U.S. gateways and European gateways. U.S. carriers also code-share on numerous services of their European carrier partners beyond European gateways to other points in Europe as well as points in the Middle East and Africa. These latter code-share operations have largely replaced U.S. carriers' previous Fifth Freedom direct operations. Regarding Asia, U.S. carriers similarly code-share on their foreign carrier partners on various Transpacific routes between U.S. gateways and Asian gateways, although the code sharing by U.S. carriers beyond such Asian gateways is more limited than is the case in Europe.

Since the U.S. carrier-foreign carrier alliances have already created Transatlantic and Transpacific networks with integrated and coordinated schedules, the foreign air carriers are positioned to provide supplemental airlift capacity, particularly with respect to services between U.S. gateways and gateways in Europe and Asia, as well as intra-Europe and intra-Asia services operated solely by the foreign air carrier alliance partners.

2. Security Alliances

Security alliances also offer a framework for foreign air carrier supplemental airlift support to DoD. Specific countries already offer the commitment of their national carriers through such security alliances; namely, South Korea, Kuwait and Israel. U.S. security alliances - either bilateral or multilateral - can be reviewed with a focus on supplemental lift by national carriers from countries party to such alliances.

3. U.S. Carriers Unwilling Or Unable To Provide Lift

Foreign air carriers also may provide supplemental airlift support to DoD in the event U.S. carriers are unwilling to provide the lift due to either risk considerations (Afghanistan) or infrastructure restrictions. Similarly, DoD requirements for certain aircraft types (AN124, for example) may be met only through foreign air carrier airlift capacity.

4. Foreign Air Carrier Willingness To Participate In The CRAF Program

In reviewing the willingness of foreign air carriers to participate in the CRAF program, it must be recognized that there never has been a systematic attempt by the USG to determine the position of such carriers (and their respective governments) on this issue. Thus, observations on possible foreign carrier participation in CRAF are based on informal discussions with carrier representatives, foreign government officials and others in the international aviation industry.

For this purpose, foreign carriers can be broken down into three categories: European carriers; Asian carriers; and carriers whose countries are directly affected by U.S. military operations.

While the U.S. has one of its strongest military alliances with European countries through NATO, European carriers remain uncertain with respect to possible participation in CRAF. The most likely participants are charter and contract carriers (such as Martinair, Transavia, etc.), which offer services comparable to similar U.S. carrier participants in CRAF. Scheduled European carriers are less certain about their participation, citing issues such as "incentives" for CRAF participation, the competitive impact of aircraft withdrawal from scheduled services, insurance protection, and flight crew availability. For a U.S. military operation in the Middle East or Africa, involving troop and cargo movements to/from or via European points, European carriers may be more interested in possible CRAF participation in an ancillary or "support" role, such as U.S.-Europe transportation or intra-Europe transportation, not involving the military combat zone.

With respect to Asian carriers, and with the exception of Korean carriers, participation in CRAF is more problematical. Japanese carriers, given the general constraints on Japan's involvement in military operations, appear reluctant to participate in CRAF, although there is the possibility of participation on an intra-Japan (to/from U.S. military bases) or regional basis. Korean carriers already provide lift, and have other commitments, through the U.S.-R.O.K military alliance and would likely be willing participants in the CRAF program on a broader basis. Elsewhere in Asia, Taiwanese carriers would likely be precluded due to obvious geopolitical considerations, and the interest of other Asian carriers may be tied to possible regional conflicts involving the U.S. While New Zealand carriers would not have an interest in participation due to their government's general position on cooperation with the U.S., Australian carriers may have an interest.

Finally, as was reflected by Kuwait's carrier in the Gulf War, carriers from countries directly affected by a U.S. military operation are likely to be willing participants in the CRAF program.

Recommendation

In order for DoD to have a fuller understanding of the extent of foreign carrier willingness to participate in the CRAF program, a survey of foreign carriers with CRAF-capable aircraft should be undertaken. The survey should identify for each carrier the factors relevant to possible CRAF participation, including the following issues: commercial considerations, labor issues (including both collective bargaining agreement provisions and relevant labor laws), insurance, national laws and policies affecting such participation, and contracting and other legal issues.

5. The Current U.S. National Airlift Policy Requires USA Actions Seeking Foreign Air Carrier Support For Airlift Security Needs

The current U.S. National Airlift Policy (issued by President Reagan on June 24, 1987) specifies (in section 8) that: "The Department of State and other appropriate agencies shall

ensure that international agreements and federal policies and regulations governing foreign air carriers foster fair competition, safeguard important US economic rights, and protect US national security interests in commercial cargo capabilities. Such agencies should also promote among US friends and allies an appreciation of the importance of intercontinental airlift and other transportation capabilities, and work to obtain further commitments from such countries and foreign air carriers in support of our mutual security interests."

While the Department of State, DoD and other U.S. agencies have considered airlift requirements in the context of bilateral and multilateral security agreements, there has been no concerted USG effort to determine whether military alliance partners and their respective national airlines are willing, and able under national laws, etc., to provide airlift "commitments…in support of our mutual security interests." To date, only one mutual security agreement (U.S.-R.O.K.) addresses the question of foreign air carrier airlift assistance for U.S. national security needs.

Recommendation

DoD, along with the Department of State and other appropriate agencies, should establish guidelines and policies to ensure that the requirement of the U.S. National Airlift Policy for commitments from military allies and their national airlines for airlift support is met in existing and future security and related bilateral and multilateral agreements.

6. Current Issues Relevant To DoD Position On U.S. Laws And Policies Governing Foreign Ownership And Control Of U.S. Carriers

While DoD has heretofore maintained the view that current U.S. laws and policies governing foreign ownership and control of U.S. carriers are appropriate for DoD's requirements relative to the CRAF program, various recent developments suggest the need to re-examine DoD's position. These recent developments involve both the U.S. aviation industry and international trends.

7. U.S. Aviation Industry

The U.S. aviation industry is facing significant changes through (1) restructuring brought on by economic conditions and (2) the competitive implications of global alliance networks involving numerous foreign air carriers.

With one major U.S. carrier already currently in Chapter 11 bankruptcy proceedings, and the possibility of other major carriers entering bankruptcy, U.S. aviation industry officials, labor union leaders and government officials are faced with the issue of whether broader access to foreign capital markets will be necessary to ensure the economic viability of U.S. carriers participating in the CRAF program. Current ownership and control restrictions have an inhibiting, if not prohibitive, impact on the willingness of foreign interests to invest in U.S. carriers. With the significant losses for the U.S. industry in 2001 and 2002, and profitability for

the industry not likely until 2004 at the earliest, attracting foreign investment in U.S. carriers will be an on-going issue as U.S. carriers struggle to meet their financial requirements for the foreseeable future.

Current ownership and control restrictions, among other factors, have been a primary reason for the creation, first, of bilateral U.S. carrier-foreign carrier alliances, and, second, the global alliance networks which now involve most major U.S. carriers. As these global alliances have developed, they have become an essential competitive element for the marketing strategies of U.S. carrier participants in such alliances. In turn, the foreign carrier partners to such alliances rely on the alliances, and the economic viability of their U.S. carrier partners, to be competitive in the international aviation market. Given these factors, foreign carriers are expressing concern about the future of such alliances and, in certain cases, are indicating a willingness to invest in their U.S. carrier partners in order to ensure the continuation of their alliances. The prospect of such investments – and the possible need for such investments by U.S. carriers – also calls into question the current U.S. limitations on ownership and control of U.S. carriers.

8. International Trends

Although the international aviation regulatory regime has been based on the concept of substantial ownership and effective control of each country's carriers by nationals of that country, there are significant trends affecting that standard.

On a national basis, there has been a shift toward allowing greater foreign ownership of national carriers. For example, China recently allowed foreign investment in its carriers, and Australia has altered its laws to allow 100 percent foreign ownership of domestic carriers and up to 49 percent foreign ownership of its international carriers. Regionally, the most significant change concerns the European Union's policy allowing ownership and control of any European carrier by any EU-member country national, and up to 49 percent non-EU national ownership of an EU carrier.

The other significant trend potentially affecting U.S. carrier ownership and control restrictions concerns multilateral air services agreements. The U.S. already has entered into a multilateral agreement with some of its APEC country partners, which eases the traditional ownership and control requirements of U.S. bilateral aviation agreements. In Europe, there is a concerted effort among many elements of the European aviation industry toward a Transatlantic Common Aviation Area (TCAA). Initially, TCAA would involve the U.S. and EU countries and one feature being sought would be a provision allowing ownership and control of any TCAA member country carrier by TCAA nationals. The move toward a U.S.-EU multilateral agreement has been strengthened by the November 2002 decision of the European Court of Justice, which found the current ownership and control provisions of various U.S.-European country bilateral air services agreements to be inconsistent with European law.

Recommendation

In light of recent developments relevant to the economic strength of and prospects for the U.S. aviation industry - including the economic viability of U.S. carrier CRAF participants - and

trends toward liberalization of the ownership and control requirements in the international aviation scheme, DoD should undertake a joint examination with DOT and DOS of the current U.S. carrier ownership and control requirements, with the goal of relaxing those requirements in a manner consistent with DoD and CRAF program needs.

II. CRAF PROGRAM REVIEW

A. STATEMENT OF OBJECTIVE

The objective of the program review is to appraise the existing CRAF program, and identify and evaluate potential alternatives to sustain CRAF or the next-generation program through the year 2010.

B. EXPLANATION OF PROCESS

As a framework for the identification and evaluation of potential alternatives, we reviewed the common interests of the Government and the CRAF participants, and used these common interests to formulate a list of nine CRAF evaluation criteria. We then reviewed the current CRAF system versus the nine CRAF evaluation criteria, and identified issues that may merit attention. For each identified issue, we prepared a short briefing. Finally, we prioritized the issues, identified potential actions, and briefly outlined our recommendations.

C. IDENTIFICATION OF COMMON INTEREST GROUPS

To develop a list of criteria, we first grouped the CRAF participants based on their primary functions. We identified five groups:

1) The US Government
2) The major US international scheduled passenger airlines
3) The "second tier" or "supplemental" US international passenger airlines
4) The US international air cargo carriers
5) The US integrated service air cargo operators

Within each group, we developed a list of primary CRAF-related interests; we then attempted to identify areas of common interest between all groups. The success of the CRAF system must be measured by its ability to meet these interests:

1. Primary CRAF-Related Interests of the US Government

The US Government is:

- Interested in obtaining reliable access to the required near-term contingency airlift capacity

- Interested in safe contingency airlift operations
- Interested in maximizing the productivity of civilian assets during a contingency airlift
- Interested in facilitating long-term civil airlift capacity and contingency access
- Interested in obtaining access to contingency airlift at a reasonable cost
- Interested in compensating the participating air carriers in a fair and equitable fashion – providing each carrier with sufficient payment in direct proportion to the anticipated wartime utility of the carrier's CRAF-pledged fleet
- Interested in fulfilling the DoD's peacetime air transportation requirements in a timely and economical manner
- Interested in establishing and maintaining cooperation between the Government and the US civil air carrier industry.

2. Primary CRAF-Related Interests of US Major Scheduled Passenger Airlines

American Airlines, Continental Airlines, Delta Air Lines, Northwest Airlines, United Airlines, and USAirways comprise approximately 87 percent of the long-range international passenger CRAF. They are:

- Interested in moving passenger traffic via their scheduled route system
- Interested in the ability to effectively manage their scheduled service passenger yield
- Interested in moving cargo in the bellies of their scheduled service aircraft
- Not ordinarily interested in international military charter flights
- Interested in cash compensation for CRAF participation
- Interested in safe contingency airlift operations
- Interested in maximizing the productivity of civilian assets during a contingency airlift
- Moderately concerned with disruption to commercial business or opportunity cost of CRAF activation
- Interested in having other carriers provide a CRAF activation buffer
- Interested in establishing and maintaining cooperation between the Government and the US civil air carrier industry.

3. Primary CRAF-Related Interests of US 2nd Tier and Supplemental Passenger Airlines

American Trans Air, Hawaiian Airlines, Omni International Airlines, and World Airways comprise approximately 13 percent of the long-range international passenger CRAF. They are:

- Interested in moving passenger traffic via their scheduled service route system (if they have one)
- Interested in operating peacetime international military charter flights
- Interested that peacetime military charter pricing fully contemplate all costs – including commissions

- Interested in cash compensation for CRAF participation
- Interested in safe contingency airlift operations
- Interested in maximizing the productivity of civilian assets during a contingency airlift
- Not strongly concerned with the disruption to commercial business or opportunity cost of CRAF activation
- Potentially willing to serve as CRAF activation buffer if properly compensated
- Interested in establishing and maintaining cooperation between the Government and the US civil air carrier industry.

4. Primary CRAF-Related Interests of US Wide-body Cargo Carriers (Non-express)

Atlas Air, Evergreen International, Gemini Air Cargo, Northwest Airlines Cargo, Polar Air Cargo, Southern Air, and World Airways comprise approximately 49 percent of the long-haul international cargo CRAF. They are:

- Interested in moving cargo traffic via their scheduled route system
- Interested in operating peacetime military cargo charter flights
- Interested in receiving their "fair share" of CRAF participation incentive
- Interested in cash compensation for CRAF participation
- Interested in safe contingency airlift operations
- Interested in maximizing the productivity of civilian assets during a contingency airlift
- Highly concerned with the disruption to commercial business or opportunity cost of CRAF activation
- Interested in having other carriers provide a CRAF activation buffer
- Interested in establishing and maintaining cooperation between the Government and the US civil air carrier industry.

5. Primary CRAF-Related Interests of US Express Cargo Carriers

DHL, FedEx, and UPS comprise approximately 51 percent of the long-haul international cargo CRAF. They are:

- Interested in moving cargo traffic via their scheduled route system
- Interested in operating peacetime military cargo charter flights
- Interested in receiving their "fair share" of CRAF participation incentive
- Interested in cash compensation for CRAF participation
- Interested in safe contingency airlift operations
- Interested in maximizing the productivity of civilian assets during a contingency airlift
- Extremely concerned with the disruption to commercial business or opportunity cost of CRAF activation

- Interested in having other carriers provide a CRAF activation buffer
- Interested in establishing and maintaining cooperation between the Government and the US civil air carrier industry

6. Common Interests

The Government list and the air carrier group lists have several common interests:

- All parties are interested in establishing and maintaining cooperation between the Government and the US civil air carrier industry
- All parties philosophically understand that the civil carriers can play a critical role in national defense
- All parties are interested in safe contingency airlift operations
- All parties are interested in maximizing the productivity of civilian assets during a contingency airlift
- All parties believe that the participating carriers should receive sufficient and equitable compensation.

D. AIRLIFT PROGRAM EVALUATION CRITERIA

Based on our review of group interests, we have identified the following nine criteria for the evaluation of a national airlift program:

- Does the system provide the Government with access to the required near-term contingency airlift capacity?
- Does the system provide for safe contingency airlift operations?
- Does the system provide for efficient contingency airlift operations?
- Does the system facilitate long-term civil airlift capacity and DoD access?
- From the Government's perspective, does the system provide access to the required contingency airlift capacity at a reasonable cost?
- From the Government's perspective, does the system facilitate the economical fulfillment of the DoD's peacetime air transportation requirements?
- Does the system foster cooperation between the Government and the US civil air carrier industry?
- Does the system provide each participating air carrier with attractive economic compensation in exchange for participation in the contingency airlift program?
- Does the system compensate participating air carriers in an equitable fashion in relation to one another?

We have reviewed the existing CRAF program to identify its strengths and weaknesses versus the evaluation criteria.

Prior to presenting the strengths and weaknesses of the current "real world" CRAF program, we offer the following description of the current CRAF program in its pure conceptual form.

E. THE VOLUNTARY CRAF PARTICIPATION INCENTIVE SYSTEM IN PURE CONCEPTUAL FORM

The CRAF was conceived to function as a voluntary program whereby each US carrier electing to participate in CRAF was to be granted a US Government peacetime transportation contract based on the capacity provided during a CRAF activation.

The concept assumed that each participating carrier would have the capacity and the interest to seek and perform a profitable US Government peacetime transportation contract. The concept also assumed that US Government peacetime transportation requirements would be large enough to attract sufficient CRAF participation.

The size of each carrier's peacetime contract was to be directly proportional to the anticipated wartime utility (or "mobilization value") of each carrier's CRAF-pledged fleet. The more militarily useful a carrier's CRAF fleet, the larger the carrier's peacetime contract.

We can use the equivalent unit concept to provide an example of the intended equality and an example of the intended reward/incentive for increased participation:

Example 1:

- Assume Carrier A pledges a fleet of twenty 747-100 equivalent units.
- Assume Carrier B pledges a fleet of twenty 747-100 equivalent units.
- Intended Result: The two carriers would receive contracts producing precisely the same level of AMC peacetime transportation revenue.

Thus, in Example 1 both Carrier A and Carrier B receive equal compensation for equal CRAF pledges.

Example 2:

- Assume Carrier A increases its pledge to forty 747-100 equivalent units.
- Assume Carrier B's pledge remains at twenty 747-100 equivalent units.
- Intended Result: Carrier A would receive a peacetime AMC transportation contract producing exactly twice as much revenue as the contract received by Carrier B.

Thus, in Example 2, Carrier A is proportionately rewarded for increasing its CRAF pledge.

The profitability of the peacetime contracts (and the resulting economic incentive for carrier participation) was to be assured using a negotiate rate-making procedure (the "Uniform Rate" or the "rate making process").

Under the Uniform Rate procedure, carriers annually report their military charter operating costs to AMC. AMC verifies the validity of the costs, then calculates an AMC carrier average cost by using a weighted average methodology, marks-up the average costs to allow an attractive rate of return, and sets a standard price per seat mile and per ton mile. Carriers successfully keeping their AMC operating costs below the average receive a higher AMC profit margin than their higher cost competitors; however, it was anticipated that the AMC rate-making process would allow all participants to achieve attractive profits.

Via this proportionate profitable compensation, DoD would meet the following CRAF participation objectives:

- Provide the Government with access to the required near-term contingency airlift capacity
- Facilitate long-term civil airlift capacity and DoD access
- Provide access to the required contingency airlift capacity at a reasonable cost – from the Government's perspective
- Facilitate the economical fulfillment of the DoD's peacetime air transportation requirements – from the Government's perspective
- Foster cooperation between the Government and the US civil air carrier industry
- Provide each participating air carrier with attractive economic compensation in exchange for participation in the contingency airlift program
- Compensate participating air carriers in an equitable fashion in relation to one another.

F. REVIEW OF THE EXISTING CRAF SYSTEM VS. EVALUATION CRITERIA

1. Summary

The pros and cons of the existing system may be summarized as follows:

Pros: Despite compensation inequities, the CRAF program has exceeded its participation targets during every fiscal year since 1996. From the Government's perspective, the program is an exceptional bargain – providing an extremely economical source of emergency capacity as well as reasonable costs for peacetime DoD transportation. The exceptional recent levels of CRAF participation may indicate that the program can withstand the current cyclical reduction in US air carrier capacity.

Cons: The negatives can be divided into two categories: operational issues and equity issues. The primary operations issue (the reliance upon civil aircraft and crews for the performance of missions into military risk zones) merits serious consideration. There also seem to be opportunities for enhancing CRAF operations efficiency. The CRAF system is extremely dependent upon the formation of CRAF carrier teams. This level of dependence may indicate

risk for the Government. CRAF compensation inequities are rampant; however, thus far the major CRAF participants have not withheld CRAF participation in response to the inequities.

A more detailed explanation versus the nine CRAF evaluation criteria is provided below:

2. Evaluation Criteria 1: Does the system provide the Government with access to sufficient near-term contingency airlift capacity?

Participation in the current CRAF system meets the Government's stated capacity objective (detailed information regarding CRAF participation is contained in Attachment A). Based on DoD mobility requirement scenarios, AMC has set capacity targets for CRAF stages 1, 2 and 3.

Participation in the long-range passenger CRAF has exceeded AMC's targets in every year since FY96. Currently, CRAF passenger aircraft participation is at approximately 203 percent of AMC's target. Participation in the long-range cargo CRAF has exceeded AMC's target in every year since FY97 and is currently at 189 percent of AMC's target. Thus, the program is attracting significant surplus capacity.

AMC's decision to accept surplus CRAF capacity has multiple ramifications and merits attention. The surplus capacity topic will be addressed in detail in Section G of this chapter, CRAF Issues.

3. Evaluation Criteria 2: Does the system provide for safe contingency airlift operations?

Civilian CRAF carriers can provide safe operations with respect to those risk factors normally encountered during civilian operations. However, civilian airline systems, aircraft, and personnel are not designed, equipped, or trained to encounter military weapons risk. As a result, it is inappropriate and inadvisable for the nation to rely upon civilian airlift for operations into those forward deployment zones that involve military risk. The issue merits serious attention. This topic will be covered in greater detail in Section G of this chapter, CRAF Issues.

4. Evaluation Criteria 3: Does the system provide for efficient contingency airlift operations?

Aside from the forward deployment issue noted above, we believe the current CRAF system provides for reasonably efficient mobilization operations. However, efficiency improvements might be feasible. This topic will be covered in greater detail in Section G of this chapter, CRAF Issues.

5. Evaluation Criteria 4: Does the system facilitate long-term civil airlift capacity and DoD access?

This criterion is closely linked to numbers 8 and 9 below.

The traditional CRAF theory holds that if the Government is providing CRAF carriers with attractive compensation in exchange for their CRAF participation, the compensation will contribute to the future financial health of the participating air carriers. Further, if the compensation is attractive and equitable, the carriers will be willing to continue participating in CRAF during future years.

The CRAF system was developed prior to the deregulation of the US civil aviation industry.

Due primarily to the exceptional growth of the US air transportation and secondarily due to reduced DoD transportation requirements due to the end of the cold war, current DoD traffic has an insignificant impact on the financial health of the nation's largest air carriers. The annual transportation purchases associated with the CRAF program pale in comparison to the annual revenue of the large carriers. (Please see Attachment B for data.) For example, the fleets of American Airlines, Continental Airlines, Delta Air Lines, Northwest Airlines, United Airlines and USAirways comprise 87 percent of the fiscal year 2003 long-range international passenger CRAF. These six passenger airlines have annual combined sales of approximately $75 billion. In conjunction with the CRAF program, AMC purchases approximately $300 million per year in long-range international passenger charters. Thus, the entire AMC long-range international passenger charter market represents only approximately four-tenths of one percent of these carrier's annual combined sales. AMC's peacetime transportation requirements are too small to create a material impact on the long-term financial health of these carriers. These carriers all participate in CRAF as "non-operating" partners of air carrier teams.

With respect to a handful of smaller "second-tier" US international air carriers, the CRAF program represents an exceptional source of peacetime revenue and contributes to the carrier's long-term survival. Among these carriers are American Trans Air, Omni Air International, World Airways and Evergreen International. These carriers all participate in CRAF as "operating partners" of air carrier teams.

CRAF teaming will be discussed in greater detail in later sections.

6. Evaluation Criteria 5: From the Government's perspective, does the system provide access to the required contingency airlift capacity at a reasonable cost?

The current CRAF program is a tremendous bargain for the Government and is a resounding success versus this criterion.

There are 433 wide-body passenger aircraft and 252 wide-body cargo aircraft pledged to the FY03 long-range international CRAF. There are an additional 46 767-300ER wide-body passenger CRAF pledged to the aero medical evacuation CRAF. In total, there are 731 CRAF aircraft pledged to the CRAF.

The current CRAF program gives the Government "on-call" access to these aircraft without requiring the Government to bear the capital cost of acquiring the aircraft, or the expense of training and retaining qualified crews and support personnel, or the cost of maintaining the aircraft and engines in airworthy condition. In exchange for participating in the CRAF program,

US civil carriers are eligible to pursue seven categories of peacetime US Government air travel. The Government receives value via these peacetime air transport services.

The Government's incremental cost of obtaining CRAF participation (and thereby obtaining the right to activate the civilian reserve fleet) is equal to the amount, if any, by which the Government over-compensates US CRAF carriers for the peacetime transportation they provide to the US Government.

As noted in the section below, in our opinion, the Government does not over-compensate US CRAF carriers for peacetime transportation. Therefore, we believe the Government is obtaining its wartime right to call upon CRAF carriers at virtually no cost.

7. Evaluation Criteria 6: From the Government's perspective, does the system help facilitate the economical fulfillment of the DoD's peacetime air transportation requirements?

From the Government's perspective, the answer is yes – the current CRAF system does provide for the economical fulfillment of the DoD's peacetime air transportation requirements.

- The only CRAF participation incentive offered by the Government to the carriers is carrier eligibility to pursue seven categories of US Government peacetime traffic.
- The Government's average total annual purchase in these seven categories is approximately $1.812 billion.
- To pursue this annual Government traffic, US international air carriers must meet minimum CRAF pledge criteria. Generally, each interested passenger carriers must pledge at least 30 percent of its CRAF-eligible fleet and each interested cargo carrier must pledge at least 25 percent of its CRAF-eligible fleet.
- In four of the seven categories, totaling approximately $1.275 billion per year (or approximately 70 percent of the $1.812 billion total), CRAF participation earns a carrier the right to bid, but does not "entitle" or guarantee that the carrier will win its bids. With respect to these four categories (and approximately $1.275 billion in annual traffic), the Government awards bids to eligible carriers based on service frequency, elapsed transit time and low price. The Government receives these services at market-determined rates – which are therefore deemed reasonable.
- The Government pays no additional mark-up on these $1.275 billion in services to compensate the carriers for the CRAF participation. Thus relative to this $1.275 billion, the incremental cost associated with inducing these carriers to participate in CRAF is nil. (And thereby represents a tremendous bargain for the US Government)
- For the remaining three categories, totaling approximately $537, AMC determines price based on a ratemaking process adopted from old Civil Aeronautics Board methodology. Under this process, those carriers providing peacetime AMC service submit their peacetime AMC service cost data. AMC reviews the data for reasonableness, eliminates extraordinary or inappropriate costs, calculates a weighted average cost, adds what it considers to be a reasonable rate of return (profit margin) and sets a uniform price per seat mile or per ton-mile. Given that AMC evaluates costs for reasonableness and

determines what it considers a reasonable rate of return, it must be concluded that AMC is receiving its peacetime transportation at a reasonable cost (from the Government's perspective).

- Given that the rates are uniform, the actual profit margin received by an operating carrier varies based on multiple criteria – including whether the carrier's operating costs are higher or lower than the average of all other AMC operators.

8. Evaluation Criteria 7: Does the system foster cooperation between the Government and the US civil air carrier industry?

The current system is only marginally successful at fostering cooperation between the Government and the US carriers. The spirit of mutual cooperation may be waning. And the current system is a voluntary, incentive-based system. Its success hinges upon the quantity and quality of the CRAF participation incentives.

Prominent CRAF carriers have cited a long-term decline in the Government's ability or willingness to distribute its peacetime traffic in proportion to CRAF participation, and the CRAF carriers are correct; the Government routinely demonstrates only a marginal commitment to the voluntary program. This topic will be covered in greater detail in Section G of this chapter, CRAF Issues.

9. Evaluation Criteria 8: Does the system provide each carrier with attractive economic compensation in exchange for participation in the contingency airlift program?

As noted above, the current CRAF system is attracting aircraft pledges well above the Government's targeted levels, and the current CRAF system is a voluntary system. These facts justify the conclusion that the current system is providing attractive compensation. However, the source of the success merits close scrutiny.

During the past 15-20 years, the overall success of the CRAF compensation system has grown progressively more dependent upon the formation of CRAF carrier contracting teams and the means by which these teams are redistributing the Government's purchasing dollars. Two massive teams dominate the fiscal year 2003 long-range international CRAF. Combined, they represent 97.5 percent of the long-range international capacity and 100 percent of the aero-medical capacity. Thus, the success of the current CRAF system is completely reliant upon carrier teaming and may, to a large extent, be outside the Government's control. This topic will be covered in greater detail in Section G of this chapter, CRAF Issues.

10. Evaluation Criteria 9: Does the system compensate participating carriers in an equitable fashion in relation to each other?

To define our concept of equitable compensation among carriers, we have identified the following objective and evaluation criteria:

Objective: Each CRAF carrier should receive compensation in direct proportion to the anticipated wartime utility of its CRAF-pledged resources. This means:

a) Carriers pledging larger or more capable aircraft should receive greater compensation than carriers pledging smaller or less capable aircraft; and
b) When aircraft are comparable, carriers pledging more aircraft should receive greater compensation than carriers pledging fewer aircraft; and
c) Carriers pledging CRAF aircraft that are higher up on the CRAF activation sequence list should receive greater compensation than those that pledge aircraft lower on the activation sequence list.

Versus these criteria, the current CRAF system has multiple failures. This topic will be covered in greater detail in Section G of this chapter, CRAF Issues.

G. CRAF ISSUES

We have identified the following ten CRAF issues:

1) The reliance upon civilian aircraft and personnel for the performance of forward deployment military-risk missions.
2) The potential opportunity for efficiency enhancements during CRAF activation.
3) The Government's unwillingness or inability to funnel its peacetime traffic to CRAF carriers in direct proportion to the anticipated wartime utility of their CRAF-pledged fleets.
4) The weak linkage between AMC's peacetime transportation requirements and the primary business focus of the nation's leading air carriers.
5) Inequitable compensation in exchange for CRAF participation.
6) The dominance of and reliance upon CRAF carrier teams.
7) The allowance of cargo/passenger "cross-over" entitlement.
8) AMC's decision to accept surplus capacity in CRAF Stage 3.
9) The under-valuation of CRAF Stage 2 participation.
10) Assigning CRAF mobilization values by stage is inaccurate; CRAF activation risk is sequential within and between stages, mobilization value assignment should be sequential.

Each issue is described in greater detail in the following sections.

1. CRAF Issue 1: The Reliance on Civil Airlift for Forward Deployment Missions

In examining CRAF and the proper role of civilian airlift for our nation's defense, we believe several facts merit identification:

The National Airlift Policy establishes that military and commercial resources are equally important and interdependent in ensuring the nation's ability to meet defense mobilization and deployment requirements in support of US defense and foreign policies.

The National Airlift Policy requires that DoD consider security (mission safety) when determining which DoD airlift requirements are appropriate for commercial air carriers.

The National Airlift Policy jointly tasks DOT and DoD to promote the incorporation of defense features in commercial aircraft.

As demonstrated by their daily non-military operations and as confirmed during the 1990-1991 Gulf War CRAF activation, US civil carriers are highly capable of airlifting vast quantities of cargo and personnel over long-haul routes.

As also demonstrated by their daily operations and confirmed during the 1990-1991 CRAF activation, US civilian aircraft, civilian airline support systems, and civilian airline communications systems are not designed, supplied, and trained for operations to airfields involving the actual or perceived risk of hostile military action.

US civilian airline personnel are not trained for military-related risks and frequently lack the appropriate safety response equipment materials.

US civilian airline personnel have chosen their occupations based on their perception of the risk/reward of airline employment. Their employment decisions have not been based on the potential need to serve their country during higher-risk airlift operations.

US civilian airline personnel at the major passenger airlines do not ordinarily provide charter service for AMC and do not perceive their continued employment as being linked to military charters. Personnel at a handful of smaller "supplemental" US airlines regularly provide military charter flights and may perceive that military operations are critical to their airline's survival.

US Gulf War civilian CRAF operations were conducted using voluntary civilian crews. The supply of voluntary civil crews is primarily dependent upon the perceived risk to the aircraft and its crew and is secondarily dependent upon the political clarity/popularity of the military action. Regardless of the terms written into the AMC CRAF contract, CRAF carriers cannot actually force non-volunteer personnel to operate CRAF missions. Thus, the viability of CRAF is dependent upon the availability of volunteer crewmembers.

CRAF passenger operations require flight attendants and thus require a higher number of volunteer crewmembers than do cargo operations.

During the 1990-91 CRAF activation, US civilian airline pilots volunteered more readily for CRAF missions than did US civilian flight attendants. This may be linked to the fact that many civilian pilots have military backgrounds.

The perceived risk to the civil aircraft and crew is largely a function of the state of hostilities and the airlift mission routing (most significantly, the mission's proximity to the hostile zone).

Logic dictates that a US enemy will consider CRAF passenger operations to be a more attractive target than CRAF cargo operations. It is prudent to assume that a US enemy may

conclude that successfully targeting a CRAF passenger mission may significantly disrupt or halt the flow of civil airlift missions. It is also prudent to assume that, given the relatively wide dissemination of information regarding CRAF passenger missions, an enterprising enemy could identify CRAF passenger targets.

Under a hazardous or politically unclear/unpopular CRAF activation, it is likely that CRAF passenger operations would suffer greater crew shortages than would CRAF cargo operations and would therefore experience lower mission completion/reliability.

Multiple insurance issues are prevalent during CRAF operations – including the applicability of life insurance policies for civil crews and support personnel participating in operations that may be higher risk than those contemplated in their normal policies. Also at issue is the applicability of insurance policies covering aircraft and other physical assets. Despite their personal patriotic feelings, crewmembers must contemplate their financial obligations and corporate decision-makers must contemplate their fiduciary responsibilities. Both of these factors may further reduce the supply of civilian CRAF crews and further jeopardize the reliability of CRAF operations involving high-risk theaters.

2. CRAF Issue 2: Potential Opportunities for Enhanced Utilization of Civil Aircraft Efficiency Enhancements During CRAF Activation

Although the 1990-91 CRAF activation was generally successful, several efficiency issues were apparent:

- CRAF planning, mission scheduling, and mission coordination overload: During the 1990-91 Desert Shield/Desert Storm CRAF activation, multiple missions were delayed, rescheduled, or cancelled because of AMC human resource overload. Could a CRAF scheduling team be established to include civilian air carrier personnel?
- CRAF aircraft utilization rate: The current CRAF plan specifies a civilian aircraft utilization target of 10 block hours per day. Most major US airlines routinely operate their international fleets at higher utilization levels. Setting a 10-hour per day utilization target seems conservative. The CRAF carriers can perform at higher levels – if DoD's planning, scheduling and coordination efforts will permit.
- Better use of civilian integrated cargo networks: The Sealift program allows sea transport providers to move military cargo using existing ocean shipping networks. During a military contingency, could major US integrated cargo service providers, such as FedEx, provide added value to the Government by integrating military cargo into their existing inter-modal transportation networks?

3. CRAF Issue 3: The Government's Unwillingness/Inability to Funnel Peacetime Traffic to CRAF Carriers in Direct Proportion to the Anticipated Wartime Utility of CRAF-Pledged Fleets

Three major events have shaped current US DoD passenger air transport policies. First, US airline deregulation led to a tremendous expansion of the US air transportation route system

and a corresponding expansion of alternative schedule and fare choices. Second, the end of the cold war reduced the number of DoD personnel stationed in Europe and Asia. Third, the development of electronic airline reservations and ticketing systems and the linking of these systems to the internet led to a geometric increase in the distribution of air transportation information and a corresponding increase in air traveler decision-making sophistication.

In response to these events and potentially due to a marginal DoD commitment to the CRAF program, AMC's international passenger traffic base has eroded. The erosion is particularly noteworthy in a the following areas:

- First, AMC was unable to sustain its wide-body passenger charter channel routes to/from the Philippines.
- Second, the frequency of AMC's wide-body passenger charter channel routes to/from Korea and Japan has been diminished.
- Third, the frequency of AMC's wide-body passenger charter routes to/from Europe has been diminished.
- Fourth, the average passenger load for AMC's remaining passenger charter channel routes has decreased, which has forced AMC to charter smaller aircraft.
- Fifth, the increased availability of non-stop international scheduled service has induced AMC to require non-stop service on certain international sectors and has thereby eliminated certain types of charter aircraft.
- Sixth, with the reduction of AMC's passenger channel flying, AMC's remaining international passenger charter requirements have become more dependent upon short-notice "ad hoc" military unit movements.
- Seventh, DoD became progressively unwilling to utilize AMC's outdated "Category Y" international scheduled service reservations and ticketing system, eliminated the program, and permitted this traffic to flow via the General Services Administration city-pair fare program.
- Eighth, DoD and GSA have been unwilling or unable to establish a system whereby GSA city pair traffic is allocated among US CRAF participants in direct proportion to their wartime utility of their CRAF-pledged fleets. (See Attachment C for a discussion of this GSA traffic issue.)

All these factors have combined to limit AMC's ability/willingness to funnel peacetime passenger traffic in proportion to CRAF mobilization value.

On the AMC cargo side, a similar list of factors has impacted AMC's ability/willingness to funnel peacetime cargo traffic in proportion CRAF mobilization value:

- The end of the cold war, the reduction of troops stationed in Asia and Europe, and the corresponding reduction in AMC cargo charter channel requirements.
- The expansion of commercial cargo capacity (both main deck and belly capacity).
- DoD's unwillingness to build its cargo pallets to fit commercial aircraft other than 747 freighters.
- The expansion of international door-to-door cargo shipment service alternatives.

These passenger and cargo events and trends have eroded AMC's ability to maintain a "pure" incentive-based CRAF system – whereby the nation's leading civil air carriers would receive attractive and equitable peacetime compensation in exchange for supplying CRAF capacity to the US Government.

4. CRAF Issue 4: The Weak Linkage Between the DoD's Peacetime Air Transportation Requirements and the Primary Business Focus of the Nation's Leading Air Carriers

Since the 1994 abolition of AMC's Category Y passenger traffic, all of AMC's long-range international passenger traffic has been charter traffic.

The aircraft of six major US international passenger airlines comprise 87 percent of the fiscal year 2003 long-range international passenger CRAF. However, none of these six major airlines elects to aggressively pursue AMC international peacetime passenger charter traffic.

The primary business focus of the six major US international passenger airlines is scheduled service. Each of these airlines has a charter department, but from the perspective of a major US airline, the AMC passenger charter market is regarded as small, difficult to forecast, overly short notice or ad hoc, inefficient to operate, expensive to operate, and low yield. (See Attachment D for a more detailed explanation regarding why major US passenger airlines do not fly peacetime AMC international charters.)

As noted in the description of CRAF Issue 3 above and as will be further described in CRAF Issue 5 below, the Government does move a significant amount of peacetime passenger traffic on scheduled service. However, the Government has been unable or unwilling to distribute this traffic in accordance with the anticipated wartime utility of CRAF carriers.

The aircraft of one US integrated cargo company comprised approximately 43 percent of the fiscal year 2002 long-range international cargo CRAF. This integrated cargo company operates MD11 and MD10 and DC10 cargo charter aircraft. However, on a day-to-day basis AMC has been unwilling to alter its cargo pallet construction contours to fit within MD11, MD10, and DC10 cargo aircraft. As a result, this integrated cargo operator is only able to receive approximately five percent of AMC's long-range international cargo charter revenue.

5. CRAF Issue 5: Inequitable Compensation in Exchange for CRAF Participation

The current CRAF system fails to provide CRAF-participating carriers with equitable compensation in exchange for their CRAF participation.

In exchange for their voluntary CRAF participation, US long-range international air carriers are eligible to pursue seven categories of peacetime DoD traffic. Combined, these categories represent approximately $1.812 billion in annual US Government air transportation purchases (pre-September 11 average).

The seven categories are:

1. Eligibility to pursue AMC long-range international passenger charter contracts. Estimated total annual AMC purchase: $300 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 25 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: AMC attempts to distribute traffic based on CRAF mobilization value.
2. Eligibility to pursue AMC long-range international cargo charter contracts. Estimated total annual AMC purchase: $182 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 25 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: AMC attempts to distribute traffic based on CRAF mobilization value.
3. Eligibility to pursue AMC long-range international "Category A" cargo (palletized cargo, less than full planeload, pick-up at military depot, drop-off at military depot): Estimated total annual AMC purchase: $55 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 25 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: AMC attempts to distribute traffic based on CRAF mobilization value.
4. Eligibility to pursue AMC domestic military passenger charter contracts. Estimated total annual AMC purchase: $62 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 25 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: charter flights are distributed based on price and service bidding; CRAF mobilization value is not considered when awarding contracts.
5. Eligibility to pursue AMC "Worldwide Express" cargo contracts (international, small parcel, office to office shipment, utilized to move cargo for DoD, other Federal Government branches and cost reimbursable government contractors). Estimated total annual AMC purchase $35 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 25 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: charter flights are distributed based on price and service bidding; CRAF mobilization value is not considered when awarding contracts.
6. Eligibility to pursue AMC "Domestic Express" cargo contracts (domestic, small parcel, office to office shipment, utilized to move cargo for DoD, other Federal Government branches and cost reimbursable government contractors). Estimated total annual AMC purchase $98 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 25 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: charter flights are distributed based on price and service bidding; CRAF mobilization value is not considered when awarding contracts.
7. Eligibility to pursue US General Services Administration (GSA) passenger transportation city pair contracts ("GSA city pair traffic"). This traffic consists of individually ticketed personnel from the DoD, from other Federal Government branches and from cost-reimbursable government contractors traveling on domestic and international scheduled passenger service. GSA estimates these Government groups collectively purchase approximately $1.08 billion in annual city pair air transportation. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 25

percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: charter flights are distributed based on price and service bidding; CRAF mobilization value is not considered when awarding contracts. It is estimated that approximately 50 percent of the $1.08 billion total market does not utilize contracted CRAF carriers, but instead elects to utilize domestic non-CRAF carriers or elects to utilize non-contract (matched or undercut) fares.

Categories 1-3 (representing a combined annual average purchase of approximately $537 million, or 30 percent of the total annual "CRAF-linked" Government purchase) are part of AMC's long-range international contract. For these three categories, the Government attempts to allocate peacetime market share in proportion to the anticipated wartime utility of each carrier's CRAF-pledged fleet.

Categories 4-7 (representing approximately $1.275 billion or 70 percent of the "CRAF-linked" annual Government purchase) are not part of the AMC long-range international contract and were tangentially linked to the CRAF during the mid-1990s. For these four non-AMC long-range international categories, the Government makes no attempt to distribute market share in proportion to the anticipated wartime utility of CRAF-pledged fleets.

Given that the Government distributes 70 percent of its "CRAF-linked" revenue without regard for CRAF mobilization value, the "CRAF-linked" compensation received by various US CRAF carriers exhibits tremendous inequity.

The GSA city pair contract traffic provides an excellent example. When "CRAF-linked" GSA revenue is evaluated versus CRAF mobilization value, the revenue variance between carriers is huge.

Estimated FY03 GSA	
CRAF Carrier	**Revenue per CRAF MV Point**
USAirways	832,266
American	399,615
Delta	362,278
Hawaiian	320,513
United	206,071
Northwest	133,909
Continental	68,361
American Trans Air	8,713

Attachment C contains a more detailed discussion of issues relating to the Government's decision to link CRAF participation with GSA city pair traffic.

The three other non-AMC long-range international Government purchasing categories (domestic military charters, domestic express cargo and worldwide express cargo) present the same inequity issues – peacetime market share is not proportionate to CRAF wartime utility.

The AMC long-range international contract poses its own set of equity issues. These categories total approximately $537 million (or 30 percent of the "CRAF-linked" annual Government purchase). In theory, AMC seeks to distribute this annual revenue to CRAF carriers (or teams) in direct proportion to their CRAF mobilization values. However, as will be described in CRAF Issue 6 below, CRAF carrier teams represent 98 percent of the long-range international CRAF. Thus, it is the teaming negotiations between carriers (not AMC) that determine the actual distribution of AMC's peacetime long-range international revenue (and the profits derived there from). There are multiple issues and inequities involving AMC and the teams. Among these are:

The actual distribution of peacetime traffic is often a function of aircraft size, range and payload characteristics – not a function of mobilization value entitlement. Thus, the apparent linkage to mobilization value is often illusory.

The existence of AMC teaming commissions allows the AMC carrier teaming system to work and allows AMC to capture CRAF participation. However, AMC's ratemaking process excludes commissions from its cost base.

6. CRAF Issue 6: The Dominance of and Reliance Upon CRAF Carrier Teams

(a) The Dominance of AMC Teams

- There are 22 air carriers participating in the FY03 long-range international CRAF.
- There are two CRAF carrier teams.
- 18 of the 22 carriers (including all the major carriers) belong to teams.

The aircraft of these two teams comprise 97.5 percent of the long range international CRAF and 100 percent of the aero-medical evacuation segment. The aircraft of the 4 independent carriers comprise 2.5 percent of the long range international CRAF.

In recent years, these two mega-teams have received:

- Approximately 97 percent of AMC's long-range international passenger revenue, and
- Approximately 97 percent of AMC's long-range international cargo revenue, and
- 100 percent of AMC's Category A (international, palletized, non-charter) cargo revenue

(b) Why Do the Carriers Form Large and Dominating Teams?

- In proportion to the number of CRAF aircraft the Government seeks, its peacetime passenger and cargo charter requirements are very low.
- The peacetime charter requirements will provide sufficient utilization for only a handful of passenger and cargo aircraft.
- For multiple reasons, AMC passenger charters are relatively unattractive to the major scheduled airlines – so these airlines seek team formation.
- AMC's peacetime cargo charter pallet contour requirements do not match the fleet of the largest CRAF cargo participant (FedEx) – so FedEx seeks team formation.

- The allowance of entitlement crossover creates a strong incentive for team formation.
- AMC's policy of allowing Stage 3 limits to be exceeded serves to increase the teaming leverage and compensation of the largest carriers, concurrently dilutes the MV of the smaller carriers and adds further fuel to team formation process.
- In order to obtain a large enough market share to generate sufficient aircraft and crew utilization, would-be operating carriers must form teams and pay commissions to large non-operating partners. If they do not, their competitors will.
- The AMC "uniform rate" methodology keeps prices below the fully allocated costs of most CRAF carriers and is a disincentive for many would-be operators.
- The AMC "uniform rate" is weighted based on historical market share not projected future market share. This is a disincentive for some would-be new operators.
- AMC teaming commissions are excluded for the rate and erode the profit margin of AMC operating carriers. The resulting lower (or non-existent) profit margin is an extreme disincentive for most would-be operators
- For several years, a few financially troubled "supplemental" carriers have been willing to bear the AMC commission cost burden and fly AMC charters. Often these AMC charters are flown solely as a means for generating contribution to overhead (the operations are not profitable on a fully-allocated basis, however the resulting revenue exceeds direct variable cost, thus the operations are better than parking aircraft). The existence of these commission-payers has allowed the system to perpetuate.

(c) <u>The Negative Ramifications of Team Dominance</u>

The extreme dominance of AMC carrier teams has several negative consequences:

- The system is overly dependent upon a handful of small airlines. The participation of most major US carriers is primarily dependent upon their receipt of AMC teaming commissions. If the flow of teaming commissions were to cease, it is logical to forecast that the CRAF participation of the major US carriers would drop significantly – or would cease. Thus, the primary participation incentive of the entire CRAF system is dependent upon the existence of a handful of small commission payers. If these small commission paying air carriers cease to exist or cease to willingly pay commissions, the primary CRAF participation incentive evaporates.
- Teaming commissions are excluded from the AMC rate methodology. AMC excludes commission costs from its rate cost pool. The existence of these commissions directly reduces the profit margin generated by AMC operating carriers. Thus, the actual profitability of AMC operations is reduced and the economic incentive to become an AMC operator is diminished. Further, the profitability of AMC operations is diminished. This reduces the likelihood that AMC will prove to be a viable long-term customer for many airlines.
- Large teams inhibit market share competition and prohibit new market entrants. Individual entities (even large ones like FedEx) cannot capture significant market share without joining or forming a team. FedEx as a stand alone entity represents 39 percent of the FY03 long-range international CRAF mobilization value; however, given AMC's

market share distribution methodology, FedEx as a stand-alone entity would be entitled to receive only a 16 percent long-range international cargo market share.

As an example of how a 16 percent market share is insufficient, please consider that AMC's entire peacetime wide-body cargo fixed buy provides sufficient year-round utilization for only two wide-body charter aircraft. In order to fully utilize one single wide-body cargo aircraft full-time year-round for AMC a carrier must have a 50 percent market share (which requires three times the mobilization value of FedEx). Clearly, any carrier desiring to significantly penetrate the market must form a team. The AMC long-range international passenger fixed buy charter market is slightly larger, but still requires exceptional mobilization value mass in order to capture a significant market share.

- Large teams (and their low cost AMC-operating partners) dominate the AMC rate.

  Given that AMC uses a weighted average cost pool methodology for the calculation of its annual rates, the large teams dominate the cost weighting. The cost weighting factors are based on the prior year's AMC market share distribution – which was based on mobilization value. The costs submitted into the rate pool are those of the AMC operating partners. The costs of the non-operating partners are not submitted. The weighting factor of the entire team is applied to costs of the team's operating partner. Operating partners must pay commissions to their non-operating partners. Commission costs are not included in the AMC rate. Lower cost carriers can afford to pay higher commissions to their non-operating partners than could higher cost competitors. Thus, lower cost carriers are more successful at establishing themselves as AMC operating partners. All these factors combine to skew the AMC rates downward.

  For example a team that may comprise 50 percent of the CRAF may have an operating partner that, as a stand-alone entity would represent only 3 percent of the CRAF. In the rate making methodology, the costs of the "3 percent carrier" would be weighted based upon the market share its captures via its partnership. Thus, the costs of the "3 percent carrier" would be weighted to comprise 50 percent of the entire rate calculation cost pool.

7. CRAF Issue 7: The Allowance of Cargo/Passenger "Crossover" Entitlement

(a) AMC Long-Range International CRAF Participation Targets, Cargo vs. Passenger

Since FY96, AMC's long-range CRAF mobilization capability targets have been 136 passenger aircraft and 120 cargo aircraft (Both targets are expressed in "747-100 equivalent units" and represent the maximum airlift requirement identified in CRAF Stage 3).

In proportion, the long-range CRAF Stage 3 mobility targets are approximately 53 percent passenger and 47 percent cargo.

(b) A Comparison of AMC Long-Range International Purchases: Cargo vs. Passenger

In the early 1990's approximately 70 percent of AMC's long-range international purchases were for passenger transport and approximately 30 percent were for cargo transport. Thus, at that point long-range cargo CRAF participation incentives lagged behind its passenger incentives.

However, the 1994 introduction of Category A cargo contracts and the 1995 elimination of AMC's Category Y passenger contracts increased AMC's cargo purchases and decreased AMC's passenger purchases.

During an average recent year, the long-range international AMC contract provides somewhere between $500 and $700 million in peacetime revenue for CRAF-participating carriers.

In recent years, approximately 55 percent of AMC's long-range international purchases have been for passenger transportation and approximately 45 percent have been for cargo.

This 55/45 split roughly parallels AMC's targeted passenger and cargo CRAF participation targets of 136 passenger aircraft and 120 cargo aircraft (a 53 percent to 47 percent ratio).

(c) AMC Permits Cargo Aircraft to Accrue Entitlement for Peacetime Passenger Revenue and Allows Passenger Aircraft to Accrue Entitlement for Peacetime Cargo Revenue

Years ago, AMC established a policy allowing cargo aircraft pledged to the long-range international CRAF to accrue entitlement for peacetime AMC long-range passenger traffic and allowing CRAF passenger aircraft to accrue entitlement for peacetime AMC cargo traffic. The policy still applies.

For the purpose of this paper, we will refer to this policy as cargo/passenger entitlement crossover.

(d) First Problem: Permitting Cargo/Passenger Entitlement Crossover is an Old Policy That May Have Outlived its Need

We believe that the allowance of cargo/passenger entitlement crossover originated prior to airline deregulation and was a retained by AMC as a method for helping address the relative discrepancy between the volume of AMC's peacetime passenger demand and the volume of AMC's peacetime cargo demand.

We believe AMC's rationale was that allowing cargo carriers to accrue revenue entitlement based on passenger traffic allowed cargo carriers to add value to AMC passenger

teams and thereby helped the cargo carriers capture AMC team passenger commissions. This helped increase the overall cargo CRAF participation incentive.

However, since the advent of Category A cargo and the elimination of Category Y passenger, AMC's cargo and passenger purchases have been in the proper proportion versus AMC's targeted levels of cargo and passenger CRAF participation. Therefore, the justification for the entitlement crossover may no longer exist.

(e) Second Problem: Cargo/Passenger Entitlement Crossover Forces Cargo and Passenger Carriers to Form Teams

Given that cargo aircraft are permitted to accrue peacetime passenger entitlement, but cannot carry passenger traffic, any CRAF cargo carrier seeking to maximize the revenue generated by its CRAF cargo pledge must join a team containing an AMC passenger operator.

Similarly, given that passenger aircraft can accrue AMC cargo entitlement but cannot carry AMC main deck cargo, any CRAF passenger carrier seeking to maximize its CRAF revenue must join a team containing an AMC cargo operator.

The cargo/passenger entitlement crossover also impacts AMC operators by necessitating that they form teams to protect their targeted AMC markets. AMC passenger operators must align themselves with CRAF cargo participants and must pay them commissions. AMC cargo operators must align themselves with CRAF passenger participants – and pay them commissions. If AMC operators fail to offer competitive commissions to their crossover partners, their crossover partners will join an opposing team.

For FY03, two massive air carrier teams account for 98 percent of all aircraft pledge to the FY03 long-range international CRAF.

In recent years, these two mega-teams have received approximately 97 percent of AMC's long-range international passenger revenue, approximately 97 percent of AMC's long-range international cargo revenue and 100 percent of AMC's Category A palletized cargo revenue.

(f) Third Problem: Cargo/Passenger Crossover Feeds the Teaming Frenzy, but Teaming Commissions are not in the AMC Rate

The AMC long-range charter pricing system excludes AMC teaming commissions. Thus, AMC is perpetuating a policy that effectively forces its operators to form alliances and pay commissions, but AMC refuses to financially acknowledge the existence of these commissions.

(g) Who Benefits From Cargo/Passenger Crossover

The primary beneficiaries of AMC's cargo/passenger crossover policy are those CRAF participants that elect to join AMC teams, but do not provide peacetime AMC service (commonly referred to as "non-operating partners"). Because of the cargo/passenger entitlement

crossover, these non-operating partners are able to collect AMC passenger commissions and AMC cargo commissions. Thus, the policy increases their CRAF participation reward.

To the extent that the cargo/passenger crossover policy may induce non-operating partners to increase their CRAF pledges, AMC may benefit from its cargo/passenger crossover policy.

Potential additional beneficiaries are those carriers whose operating costs are lower than the average costs contained in AMC's annual rate pool. When compared to higher cost operators, these lower cost carriers may have greater ability to absorb higher commission cost and may be more successful in luring non-operating partners to join their AMC teams.

(h) Who is harmed by Cargo/Passenger/Cargo Entitlement Crossover

The AMC cargo/passenger entitlement crossover policy primarily damages AMC operating carriers. To maintain market share, the AMC operating carriers must align themselves with crossover partners and must pay crossover commissions. Given that AMC refuses to incorporate the teaming commissions in its cargo and passenger charter rates, the crossover commissions directly reduce the profit margin of the AMC operating carriers. Thus, the AMC operating carriers bear the burden of AMC's outdated crossover entitlement policy.

The teaming frenzy and the profit margin erosion resulting from crossover commissions is distinctly damaging to those AMC-operating carriers with average or above average costs. Since AMC uses a "uniform rate" or "common rate" pricing methodology, lower cost AMC operators are better able to absorb the operating margin reduction caused by AMC teaming crossover commissions. These lower cost carriers can consistently offer higher commission compensation to their non-operating partners.

The cargo/passenger entitlement crossover may also be damaging to larger CRAF carriers that might otherwise prefer to compete without being forced to court crossover partners and pay crossover commission and erode AMC operating margin.

The teaming frenzy caused, in part, by entitlement crossover and the prevalence of crossover commissions might also serve to discourage some carriers from seeking to become AMC peacetime operators.

8. CRAF Issue 8: AMC's Decision to Accept Surplus Stage 3 Capacity

(a) CRAF Issue: Allowing Surplus Participation in CRAF Stage 3

Description

Based on its wartime planning scenarios, AMC has established CRAF participation targets for Stages 1, 2 and 3 of the long-range international CRAF. The targets are commonly

expressed as number of 747-100 equivalent aircraft. The fiscal year 2003 targets and the actual fiscal year 2003 CRAF participation levels are as follows:

	Stage 1	Stage 2	Stage 3	Total
Cargo Target	30	45	45	120
Cargo Actual	30.5	44.8	146	221.3
Actual vs. Target	102%	100%	324%	
	Stage 1	Stage 2	Stage 3	Total
Passenger Target	30	57	49	136
Passenger Actual	30.7	56.7	188.5	275.9
Actual vs. Target	102%	99%	385%	

Note that AMC has capped Stage 1 and Stage 2 participation at its target levels but has accepted over three times its targeted CRAF Stage 3 capacity. (The weighted average for the combined cargo and passenger Stage 3 is 356 percent.)

AMC's decision to allow over-subscription to CRAF Stage 3 has multiple implications:

Pros

- Accepting extra aircraft allows DoD access to extra capacity if actual Stage 3 wartime requirements are higher than forecasted.
- Accepting extra aircraft provides a measure of the effectiveness of the strategies used to capture CRAF participation.

Cons

- Since Stage 3 represents the DoD's maximum forecasted requirement for civil airlift, there is minimal benefit from allowing Stage 3 over-subscription.
- Given the minimal benefit associated with surplus Stage 3 capacity, there is no justification for allowing the pursuit or acceptance of Stage 3 surplus capacity to create significant negative implications with respect to CRAF Stage 1, Stage 2 and aero-medical participation.
- Allowing surplus CRAF Stage 3 capacity inflates CRAF Stage 3 mobilization value and thereby proportionately dilutes the mobilization value associated with participation in CRAF Stage 1, CRAF Stage 2 and the CRAF aero-medical segment.
- Given that CRAF Stage 1 and 2 are more likely to be activated than is CRAF Stage 3 and thereby pose a greater risk to the airlines, diluting the reward for Stage 1 and Stage 2 participation is inappropriate.

- As an extra incentive for CRAF Stage 1 participation, AMC grants double mobilization value credit to CRAF Stage 1 aircraft. However, by accepting 3.56 times its target number of Stage 3 wide-body equivalents, AMC has more than negated its own intended Stage 1 participation bonus.
- AMC carrier teaming agreements frequently utilize mobilization value as a basis for determining the distribution of commissions within a team. The extra Stage 3 mobilization points may be shifting commission away from Stage 1 and 2 participants and towards Stage 3 participants. Since AMC does not include commissions in its rates, commission payments are a burden on AMC operating carriers. These operating carriers may therefore be bearing the financial burden of AMC's decision to accept surplus Stage 3 capacity.

(b) Quantification of Impact

AMC seeks to distribute three categories of long-range international traffic in proportion to CRAF mobilization value (long-range international passenger charters, long-range international cargo charters and Category A depot-to-depot international palletized cargo). During fiscal years 1992-2001, these three categories of AMC long-range international traffic combined to average approximately $600 million per year.

Assuming AMC limited Stage 1, 2 and 3 participation to its targeted levels and maintained its existing mobilization value calculation methodology, the distribution of passenger and cargo mobilization values by stage (and the resulting distribution of approximate annual AMC market share by stage) would be approximately:

	Stage 1	Stage 2	Stage 3	Total
Cargo	40%	30%	30%	100%
Passenger	36%	34%	30%	100%
Average	38%	32%	30%	100%
Annual $	228 million	194 million	178 million	600 million

However, by allowing its Stage 3 participation target to be exceeded, the actual FY03 distribution of mobilization values (and the resulting distribution of AMC market share by stage) is as follows:

	Stage 1	Stage 2	Stage 3	Total
Cargo	24%	18%	58%	100%
Passenger	20%	18%	61%	100%
Average	22%	18%	60%	100%
Annual $	132 million	109 million	359 million	$600 million

The variance in market share distribution is as follows:

	Stage 1	Stage 2	Stage 3	Total
Annual $	(96 million)	(85 million)	181 million	0

Thus, Stage 3 participation, which was intended to comprise 30 percent of the total mobilization value pool, is actually receiving approximately 60 percent of the total CRAF mobilization value. As a result, the distribution of AMC peacetime market share based on CRAF Stage 1 and Stage 2 participation is diluted by approximately $181 million per year (and the distribution of market share based on CRAF Stage 3 is inflated by approximately $181 million per year).

We do not believe that AMC has fully contemplated this consequence and do not believe the marginal benefit of surplus Stage 3 participation can justify such an extreme dilution of the value of Stage 1 and 2 participation.

9. CRAF Issue 9: The Under-valuation of CRAF Stage 2 Participation

It is widely accepted that CRAF Stage 1 is more likely to be activated than is CRAF Stage 2 and CRAF Stage 2 is more likely to be activated than is CRAF Stage 3. Thus, from the perspective of a CRAF carrier, Stage 1 has the highest activation risk, Stage 2 has the next highest level of activation risk and Stage 3 has the lowest level of activation risk.

In an attempt to establish extra participation incentive and thereby account for the higher activation risk, AMC established a policy whereby aircraft pledged to CRAF Stage 1 receive double mobilization value credit. The extra mobilization value credit allows carriers that elect to heavily participate in CRAF Stage 1 to receive increased entitlement to AMC's peacetime traffic.

The concept of allowing extra credit for Stage 1 participation is logical. However, AMC has failed to apply the same logic and differentiate mobilization value between CRAF Stage 2 and CRAF Stage 3 participation.

Assuming that AMC maintains a three stage CRAF, logic should dictate that:

(a) CRAF Stage 1 is higher risk than is CRAF Stage 2 or 3; therefore aircraft pledged to Stage 1 should receive more credit than those pledged to Stage 2 or 3, and

(b) CRAF Stage 2 is higher risk than is CRAF Stage 3; therefore aircraft pledged to Stage 2 should receive more credit than aircraft pledged to Stage 3.

10. CRAF Issue 10: Assigning CRAF Mobilization Values by Stage is Arbitrary and Inaccurate; Actual CRAF Activation Risk and Mobilization Value are Sequential

This issue relates to Issue 9 above and takes the logic a step further.

Consider the long-range international cargo CRAF as an example. AMC's CRAF participation targets call for:

Stage 1: wide-body equivalent units 1 through 30

Stage 2: wide-body equivalent units 31 through 75

Stage 3: wide-body equivalent units 76 through 120.

The dividing lines between the CRAF stages are arbitrary.

As dictated by logic and as confirmed during the 1990-91 CRAF activation, actual CRAF requirements rise and fall sequentially – not in accordance with these broad CRAF stages.

Given that the three CRAF stages are arbitrary, any methodology that assigns CRAF mobilization value based on CRAF stage becomes arbitrary and inequitable.

For example, in AMC's current system, wide-body unit 1 and wide-body unit 30 are both in Stage 1 and are therefore considered equivalent in terms of mobilization value. However, in reality the wartime value of unit 30 is markedly below that of unit 1. To grant unit 30 equal credit with unit 1 is inequitable. This same issue is present in each CRAF Stage. To grant unit 75 equal credit with unit 31 is inequitable. To grant unit 120 equal credit unit 76 is also inequitable.

Linking mobilization value bonuses to CRAF stages multiplies the inequity. For example, by virtue of being in Stage 1, unit 30 receives a 100 percent CRAF Stage 1 mobilization value bonus. Thus, although the wartime value of unit 30 is only slightly higher than that of unit 31, unit 30 receives twice the mobilization value credit.

In reality the likelihood of aircraft being activated is sequential and the assignment of mobilization value should be sequential. Logic dictates that aircraft 1 should receive slightly more mobilization value credit than should aircraft 2; aircraft 2 should receive slightly more than aircraft 3; aircraft 3 should receive slightly more credit than aircraft 4; and the process should continue right through aircraft 120 (or whatever the last aircraft is).

H. ISSUES SURROUNDING LINKAGE OF CRAF AND GSA CITY PAIR PASSENGER CONTRACTS:

1. Summary of Issues

The GSA's city pair contracting methodology does not contemplate the anticipated value of each carrier's CRAF pledge as viewed from a war planning (or mobilization value) perspective. Thus there is minimal direct linkage between the size, composition and wartime utility of a carrier's CRAF pledge and the carrier's actual annual GSA city pair revenue.

The issue may be subdivided as follows:

- The GSA methodology does not differentiate between carriers of varying fleet sizes.
- The GSA methodology does not differentiate between aircraft types.

- The GSA methodology does not provide incentive for participation above a 30 percent threshold.
- US domestic carriers (lacking long-haul international fleets) are eligible for GSA traffic without participation in CRAF
- A significant percentage of Government travelers elect to not utilize the GSA contracted air carrier

2. Ballpark Quantification of Some Inequities: The 6 Largest US Airlines

US Airways receives an estimated 2.1 times more GSA revenue per CRAF mobilization point than does American. American receives 10 percent more than Delta. Delta receives 76 percent more than United. United receives 54 percent more than Northwest and Northwest receives 96 percent more than Continental.

Comparing the highest and the lowest, US Airways receives more than 12 times more GSA revenue per CRAF mobilization point than does Continental.

3. GSA Issue Synopsis Part 1

The GSA methodology does not differentiate between carriers of varying fleet sizes.
In order to be eligible to bid for annual GSA city pair contracts, US passenger carriers are required to have a least 30 percent of their eligible aircraft pledged to the CRAF.

Once the 30 percent eligibility threshold is met, GSA awards its annual contracts based on elapsed transit time parameters, service frequency and price bidding. The system does not contemplate the anticipated relative value of each carrier's CRAF pledge from a war planning (or mobilization value) perspective.

For example, in order to be eligible to seek GSA awards, midsize Carrier A may pledge 5 of its 15 aircraft to the CRAF and major Carrier B may pledge 50 of its 150 aircraft to the CRAF.

From a DoD war planning (mobilization value) perspective, Carrier B's 50 CRAF aircraft may be approximately ten times more valuable than Carrier A's 5 CRAF aircraft, however, under the GSA city pair contracting system, this differential is not acknowledged.

Carrier A and Carrier B may both offer daily non-stop service for a route over which GSA forecasts to move 5,000 passengers per year. Carrier A may bid $299/seat and Carrier B may bid $300/seat. Under such a scenario, despite its pledge of ten times as many CRAF aircraft, Carrier B may lose the particular city pair contract (and approximately $1,500,000) in annual revenue to carrier A as a result of a $1 difference in their bid.

Thus, the GSA system fails to proportionately reward CRAF participation.

4. GSA Issue Synopsis Part 2

The GSA methodology does not differentiate based on aircraft type.

Carrier C may have a fleet of 40 modestly capable wide-body aircraft (such as 767-200ER) and may pledge 12 aircraft (30 percent). Carrier D may have a fleet of 40 highly capable wide-body aircraft (such as 747-200 and 747-400) and may pledge 12 aircraft (30 percent).

AMC analysis indicates that, during CRAF activation, the anticipated utility of a 747-200 or a 747-400 aircraft is more than double that of a 767-200ER aircraft.

From a GSA contract fare perspective, both carriers would meet the 30 percent CRAF participation threshold and both would be equally eligible to receive GSA city pair contract awards.

From a military deployment (or mobilization value) perspective, Carrier D's CRAF pledge would be more than twice as valuable to the US Government, however, the GSA contracting system does not contemplate anticipated wartime capability. In awarding its GSA city pair contracts, GSA would give no preference to Carrier D as a result of its higher-capability fleet.

Thus, the GSA system fails to proportionately reward anticipated CRAF operations capability.

5. GSA Issue Synopsis Part 3

The GSA methodology does not provide incentive for CRAF participation above a 30 percent threshold.

As noted above, in order to be eligible to bid for annubal GSA city pair contracts, US passenger carriers are required to have a least 30 percent of their eligible aircraft pledged to the CRAF.

Carriers E and F may have identical fleets of 20 wide-body passenger aircraft. Carrier E may pledge 6 or the aircraft to the CRAF (30 percent). Carrier F may contemplate pledging all 20 of its aircraft (100 percent).

From a military deployment (or mobilization value) perspective, Carrier F's pledge of 20 aircraft would be significantly more valuable to the US Government than would Carrier E's pledge of 6 aircraft, however, the GSA contracting system does not contemplate anticipated wartime capability. When bidding against Carrier E (or any other GSA carrier), Carrier F would not receive any GSA-related benefit resulting from pledging additional aircraft. Carrier F (with its 100 percent pledge) could lose a multi-million dollar GSA contract to Carrier E (with its 30 percent pledge) over a $1/seat price bid variance.

Thus, the GSA system fails to provide any incremental reward to those carriers that might be willing to exceed GSA's 30 percent minimum CRAF participation requirement.

6. GSA Issue Synopsis Part 4

Domestic US carriers, whose fleets do not include long-haul aircraft, are not required to pledge 30 percent of their fleets to the CRAF program in order to establish eligibility to receive GSA city pair contracts.

Continental Airlines comprises approximately 13 percent of the international passenger CRAF. Southwest Airlines is not in the CRAF. GSA FY03 estimates indicate that Southwest Airlines will receive approximately 25 percent more GSA city pair revenue than will Continental.

For those GSA routes where the two carriers compete, Continental receives no preference versus its non-CRAF competitor and therefore receives no fiscal consideration in exchange for its CRAF participation.

GSA's fiscal year 2003 city pair contract award press release indicates that non-CRAF carriers will receive over $100,000,000 in GSA city pair traffic during fiscal year 2003.

Thus, as evaluated versus the anticipated wartime utility of its US flag air carriers, the GSA city pair system provides inequitable compensation.

7. GSA Issue Synopsis Part 5

Many Government travelers elect to not utilize GSA's contracted airline.

Airlines need not receive a GSA contract to pursue Government traffic. Airlines not having a GSA contract for a certain city pair may match or undercut a published GSA fare at will. US airlines do not need to be in CRAF to match or undercut published GSA city pair fair. Many carriers will offer lower cost government airfares in limiting seating inventory classes.

Effectively, published GSA city pair fares function as an upper price limit, not a lower price limit or a fixed firm price.

It is estimated that approximately 40 percent (or over $400 million per year) of "would-be" GSA city pair traffic spills out of the city pair contract system and travels on alternative fares.

Thus, by failing to mandate that its travelers utilize the GSA contracted city pair airlines, the Government fails to provide an equitable reward for those carriers that elect to participate in CRAF and are subsequently awarded GSA city pair contracts.

8. Solution Alternatives

- Fix the linkage or eliminate the linkage
- Replace the 30 percent threshold with a different criterion.
- Increase the threshold.
- Eliminate the 30 percent threshold.
- Mandate that Government travelers must travel via the contracted airline.
- Establish linkage over selected international routes by introducing mobilization value into the GSA contracting process.

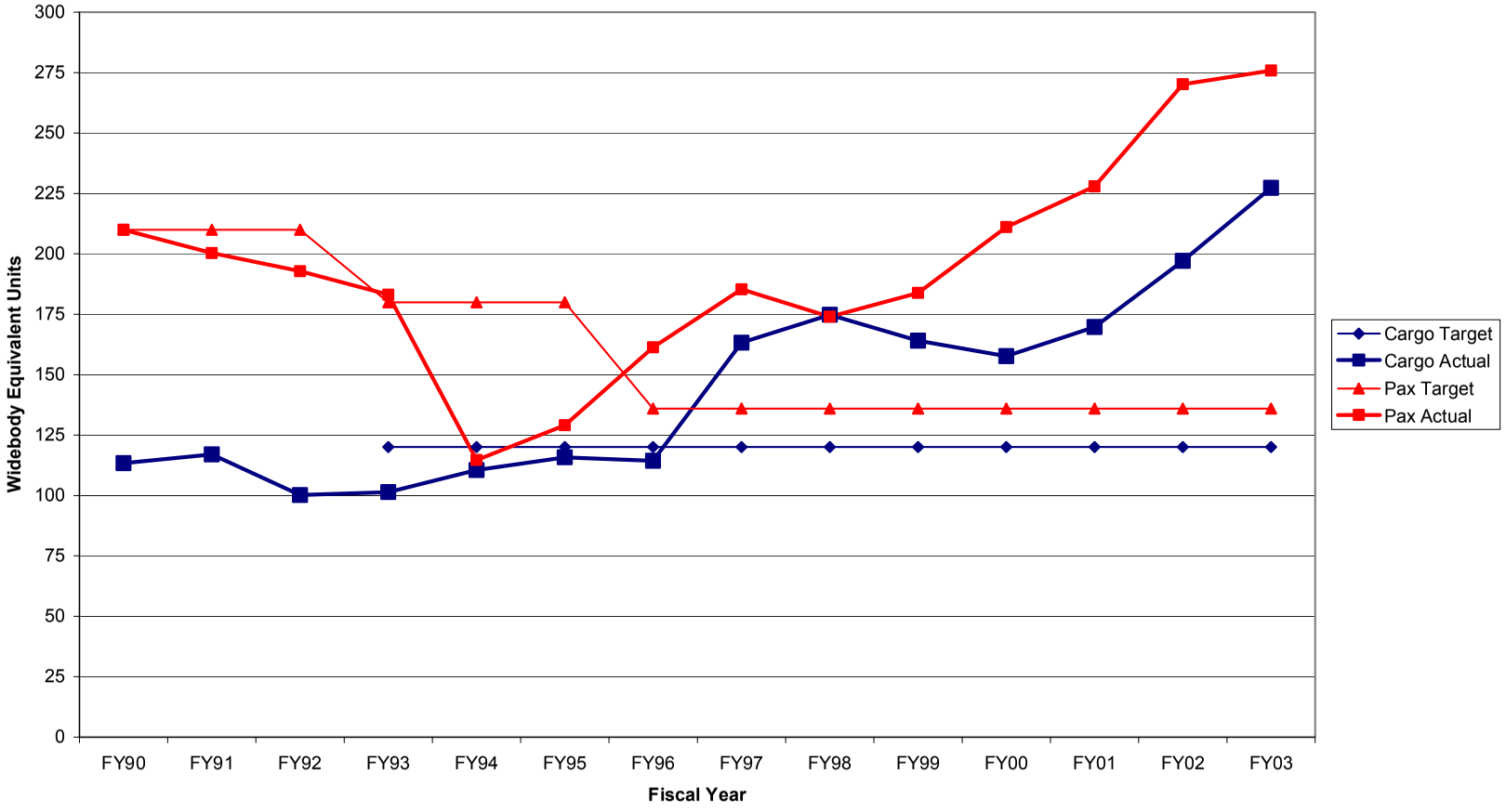
I. 10 REASONS WHY THE MAJOR PASSENGER AIRLINES DO NOT FLY AMC PEACETIME PASSENGER CHARTERS:

- The volume and frequency of AMC passenger charter operations fluctuates significantly from week to week, month to month and year to year. The market involves extensive revenue uncertainty.
- Relative to the international scheduled service networks of the major passenger carriers, the AMC passenger charter market is extremely small. The entire AMC passenger charter market can only support a handful of aircraft.
- AMC's passenger charter routes involve extreme geographic decentralization and involve significant crew, catering, ground handling and maintenance inefficiencies. The union work rules at the major airlines compound the costs associated with non-geographically focused operations.
- The vast majority of AMC passenger charter operations are "offline" (they do not transit the airports normally utilized for commercial service. Offline operations require a disproportionate amount of management attention. For a major airline, offline operations must produce significantly superior economic returns to justify their pursuit.
- AMC purchases a significant portion of its passenger charters ad hoc on relatively short notice. The major passenger airlines' planning, scheduling, operations and union structures are not designed or well-suited for ad hoc operations. Unless an organization has personnel allocated specifically for ad hoc operations, such operations distract personnel from their primary functions. Such distraction is only justifiable if it creates significantly superior economic returns.
- AMC's pricing and payment methodology rewards an "all-coach" seating configuration – which is not commonly utilized for international scheduled service operations. AMC charters have no requirement for, and offer no additional compensation for, first class or business class seating. The major passenger carriers are not interested in creating "sub-fleets" by reconfiguring aircraft specifically to pursue the relatively small AMC market.
- The AMC rate methodology keeps AMC pricing below the cost level for the many major carriers

- Team formation is needed to achieve significant market share. Even with significant market share, AMC charter aircraft utilization is far below that obtained via the major airlines' international scheduled service.
- Teaming commissions are excluded from the rate; thus the profit margin for AMC operations is marginal at best.
- Smaller "supplemental" passenger carriers have, thus far, been willing to pay attractive commission rates to their AMC team partners. Thus the major passenger carriers can join a team and make an AMC profit without flying – and can focus their attention and their resources on their primary product lines.

ATTACHMENTS

Chapter II: ATTACHMENT A-1



Chapter II: ATTACHMENT A-2

Cargo

Fiscal Year	CRAF Cargo Stage 1 Requirement	Actual Cargo Aircraft Pledged to Stage 1	Stage 1 Cargo Actual vs. Requirement	CRAF Cargo Stage 2 Requirement	Actual Cargo Aircraft Pledged to Stage 2	Stage 2 Cargo Actual vs. Requirement	CRAF Cargo Stage 3 Requirement	Actual Cargo Aircraft Pledged to Stage 3	Stage 3 Cargo Actual vs. Requirement
FY90	19	19.1	101%	30	31.5	105%	Unlimited	113.3	n/a
FY91	19	19.6	103%	30	32.1	107%	Unlimited	117	n/a
FY92	19	19.6	103%	30	32.1	107%	Unlimited	100.2	n/a
FY93	25	24.8	99%	55	58	105%	120	101.4	85%
FY94	30	31	103%	75	75.3	100%	120	110.5	92%
FY95	30	30	100%	75	75.1	100%	120	115.8	97%
FY96	30	33.4	111%	75	82.6	110%	120	114.4	95%
FY97	30	32.7	109%	75	78.4	105%	120	163.2	136%
FY98	30	30	100%	75	76.3	102%	120	174.8	146%
FY99	30	32.9	110%	75	79.6	106%	120	164	137%
FY00	30	30	100%	75	75.2	100%	120	157.7	131%
FY01	30	32.2	107%	75	76.5	102%	120	169.7	141%
FY02	30	33.3	111%	75	80.1	107%	120	197.1	164%
FY03	30	30.5	102%	75	75.3	100%	120	227.3	189%

Passenger

Fiscal Year	CRAF Pax Stage 1 Requirement	Actual Pax Aircraft Pledged to Stage 1	Stage 1 Pax Actual vs. Requirement	CRAF Pax Stage 2 Requirement	Actual Pax Aircraft Pledged to Stage 2	Stage 2 Pax Actual vs. Requirement	CRAF Pax Stage 3 Requirement	Actual Pax Aircraft Pledged to Stage 3	Stage 3 Pax Actual vs. Requirement
FY90	16	16.6	104%	65	64.9	100%	210	210	100%
FY91	16	17.2	108%	65	65	100%	210	200.3	95%
FY92	16	16.1	101%	60	60.7	101%	210	192.8	92%
FY93	25	25.4	102%	65	65.9	101%	180	183.1	102%
FY94	30	30.5	102%	85	85.5	101%	180	114.7	64%
FY95	30	30.1	100%	85	85.2	100%	180	129.1	72%
FY96	30	30.6	102%	87	87.1	100%	136	161.3	119%
FY97	30	30	100%	87	87.2	100%	136	185.3	136%
FY98	30	30.6	102%	87	88	101%	136	174	128%
FY99	30	30.4	101%	87	87.3	100%	136	183.8	135%
FY00	30	31.4	105%	87	87.2	100%	136	211.1	155%
FY01	30	30.2	101%	87	87.1	100%	136	227.9	168%
FY02	30	32.2	107%	87	89.4	103%	136	270.2	199%
FY03	30	30.7	102%	87	87.4	100%	136	275.9	203%

Chapter II. ATTACHMENT A-3

Fiscal Year 2003, AMC CRAF Long Range International and Aeromed Mobilization Values

MV by Carrier

CRAF Carrier	Team	Longe Range International Pax MV	Long Range International Cargo MV	Aeromed MV	Total MV
FedEx	1	0.00	1,048.52	0.00	1,048.52
United	2	824.96	0.00	0.00	824.96
Northwest	1	560.08	163.63	0.00	723.71
Delta	2	307.47	0.00	401.93	709.40
American	2	633.11	0.00	0.00	633.11
Atlas	1	0.00	566.13	0.00	566.13
Continental	2	482.73	0.00	0.00	482.73
American Trans Air	1	229.55	0.00	0.00	229.55
Polar	1	0.00	199.36	0.00	199.36
USAirways	2	78.61	0.00	108.83	187.44
World	2	116.00	58.90	0.00	174.90
Gemini	1	0.00	174.84	0.00	174.84
Evergreen	2	0.00	144.50	0.00	144.50
UPS	2	0.00	111.76	0.00	111.76
Omni	1	47.45	26.19	0.00	73.64
Air Transport Intl	none	0.00	63.80	0.00	63.80
Southern Air	2	0.00	49.30	0.00	49.30
Arrow	none	0.00	46.35	0.00	46.35
DHL	2	0.00	35.87	0.00	35.87
Hawaiian	none	34.32	0.00	0.00	34.32
North American	2	17.03	0.00	0.00	17.03
Airborne Express	none	0.00	16.54	0.00	16.54
Kalita	none	0.00	0.00	0.00	0.00
Totals		3,331.31	2,705.69	510.76	6,547.76
Team 1		837.08	2,178.67	0.00	3,015.75
Team 2		2,459.91	400.33	510.76	3,371.00
Independents		34.32	126.69	0.00	161.01
Total		3,331.31	2,705.69	510.76	6,547.76

Carrier Percentages of Total CRAF MV

CRAF Carrier	Longe Range International Pax MV	Long Range International Cargo MV	Aeromed MV	Total MV
FedEx	0.0%	38.8%	0.0%	16.0%
United	24.8%	0.0%	0.0%	12.6%
Northwest	16.8%	6.0%	0.0%	11.1%
Delta	9.2%	0.0%	78.7%	10.8%
American	19.0%	0.0%	0.0%	9.7%
Atlas	0.0%	20.9%	0.0%	8.6%
Continental	14.5%	0.0%	0.0%	7.4%
American Trans Air	6.9%	0.0%	0.0%	3.5%
Polar	0.0%	7.4%	0.0%	3.0%
USAirways	2.4%	0.0%	21.3%	2.9%
World	3.5%	2.2%	0.0%	2.7%
Gemini	0.0%	6.5%	0.0%	2.7%
Evergreen	0.0%	5.3%	0.0%	2.2%
UPS	0.0%	4.1%	0.0%	1.7%
Omni	1.4%	1.0%	0.0%	1.1%
Air Transport Intl	0.0%	2.4%	0.0%	1.0%
Southern Air	0.0%	1.8%	0.0%	0.8%
Arrow	0.0%	1.7%	0.0%	0.7%
DHL	0.0%	1.3%	0.0%	0.5%
Hawaiian	1.0%	0.0%	0.0%	0.5%
North American	0.5%	0.0%	0.0%	0.3%
Airborne Express	0.0%	0.6%	0.0%	0.3%
Kalita	0.0%	0.0%	0.0%	0.0%
Totals	100.0%	100.0%	100.0%	100.0%
Team 1	25.1%	80.5%	0.0%	46.1%
Team 2	73.8%	14.8%	100.0%	51.5%
Independents	1.0%	4.7%	0.0%	2.5%
Total	100.0%	100.0%	100.0%	100%

FY03 AMC INTERNATIONAL AIRLIFT SERVICES CONTRACT (1 OCT 02 - 30 SEP 03)

NGE, SHORT-RANGE, & AEROMEDICAL AIRCRAFT, CAPABILITY, MV POINTS, & STAGE ASSIGNMENT

FY03 LONG-RANGE CARGO

As of 1 Oct 02

ACFT *MTM* *CAP*	B747-100F EQUIV FACTOR	x 10 = or x 12 =	BASIC ACFT MV	STAGE I	STAGE II	STAGE III	FINAL ACFT MV	% OF STAGE 1 CARGO WBE	% OF STAGE 2 CARGO WBE	% OF STAGE 3 CARGO WBE	% OF MV CARGO PAX AE MV
0.07050969	**0.413621795**		4.136217949	0	0	1	4.136217949				
0.07050969	**0.413621795**		4.136217949	0	1	1	4.136217949				
0.07050969	**0.413621795**		4.136217949	1	1	1	8.272435897				
				1	**2**	**3**	**16.54487179**				0.2526829
				0.413621795	**0.82724359**	**1.240865385**		1.35665982	1.10052487	0.56110335	
0.05640776	**0.330897436**		3.308974359	1	1	1	6.617948718				
0.08279203	**0.485672043**		4.85672043	0	0	1	4.85672043				
0.08279203	**0.485672043**		4.85672043	0	0	1	4.85672043				
0.08279203	**0.485672043**		4.85672043	0	1	1	4.85672043				
0.07824302	**0.458986766**		4.589867659	0	1	1	4.589867659				
0.07824302	**0.458986766**		4.589867659	0	0	1	4.589867659				
0.09023401	**0.529327957**		5.29327957	0	0	1	5.29327957				
0.09023401	**0.529327957**		5.29327957	1	1	1	10.58655914				
				2	**4**	**8**	**46.24768404**				0.70632152
				0.860225393	**1.804884202**	**3.764543011**		2.82149838	2.40113066	1.70227787	
0.06368618	**0.373593879**		3.735938792	0	0	1	3.735938792				
0.06368618	**0.373593879**		3.735938792	0	0	1	3.735938792				
0.06550578	**0.38426799**		3.842679901	1	1	1	7.685359801				
0.06368618	**0.373593879**		3.735938792	0	0	1	3.735938792				
0.06550578	**0.38426799**		3.842679901	1	1	1	7.685359801				
0.06141167	**0.360251241**		3.602512407	0	1	1	3.602512407				
0.06141167	**0.360251241**		3.602512407	0	0	1	3.602512407				
0.06141167	**0.360251241**		3.602512407	0	0	1	3.602512407				
0.06141167	**0.360251241**		3.602512407	0	0	1	3.602512407				
0.06141167	**0.360251241**		3.602512407	0	0	1	3.602512407				
0.08188223	**0.480334988**		4.803349876	0	0	1	4.803349876				
0.08188223	**0.480334988**		4.803349876	0	1	1	4.803349876				
0.08188223	**0.480334988**		4.803349876	1	1	1	9.606699752				
				3	**5**	**13**	**63.80449752**				0.97445938
				1.248870968	**2.089457196**	**5.131578784**		4.09623739	2.77971282	2.32043385	
0.18300831	**1.073557692**		10.73557692	0	0	0	0				
0.18300831	**1.073557692**		10.73557692	0	0	0	0				
0.23577174	**1.383076923**		13.83076923	0	0	0	0				
				0	**0**	**0**	**0**				0
				0	**0**	**0**		0	0	0	
0.07642341	**0.448312655**		4.483126551	0	0	1	4.483126551				
0.07642341	**0.448312655**		4.483126551	0	0	1	4.483126551				
0.07642341	**0.448312655**		4.483126551	0	0	1	4.483126551				
0.07642341	**0.448312655**		4.483126551	0	0	1	4.483126551				
0.07642341	**0.448312655**		4.483126551	0	1	1	4.483126551				
0.07642341	**0.448312655**		4.483126551	0	1	1	4.483126551				
0.07642341	**0.448312655**		4.483126551	1	1	1	8.966253102				
				1	**3**	**7**	**35.86501241**				0.54775132
				0.448312655	**1.344937965**	**3.138188586**		1.47044419	1.78924043	1.41904847	

0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.073602	**0.431761787**		4.317617866	0	0	1		4.317617866				
0.14976985	**0.878575269**		8.785752688	0	0	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	0	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	0	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	0	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	0	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	0	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	0	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	1	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	1	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	1	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	1	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	1	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	1	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	1	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	1	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	0	1	1		8.785752688				
0.14976985	**0.878575269**		8.785752688	1	1	1		17.57150538				
0.14976985	**0.878575269**		8.785752688	1	1	1		17.57150538				
0.14976985	**0.878575269**		8.785752688	1	1	1		17.57150538				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				
0.18279363	**1.072298387**		12.86758065	0	0	1		12.86758065				

0.18279363	**1.072298387**		12.86758065	1	1	1		25.73516129				
0.18279363	**1.072298387**		12.86758065	1	1	1		25.73516129				
0.18232851	**1.069569892**		12.83483871	0	1	1		12.83483871				
0.18232851	**1.069569892**		12.83483871	0	1	1		12.83483871				
0.18232851	**1.069569892**		12.83483871	0	1	1		12.83483871				
				10	**28**	**111**		**1048.516948**				16.0135604
				10.14181452	**27.3040457**	**84.20299318**			33.2646693	36.3239821	38.0755092	
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	0	1		9.004032258				
0.15349084	**0.900403226**		9.004032258	0	1	1		9.004032258				
0.18977049	**1.113225806**		13.35870968	0	0	1		13.35870968				
0.18977049	**1.113225806**		13.35870968	0	1	1		13.35870968				
0.18977049	**1.113225806**		13.35870968	0	1	1		13.35870968				
0.18977049	**1.113225806**		13.35870968	1	1	1		26.71741935				
				1	**4**	**16**		**174.8419355**				2.67028769
				1.113225806	**4.240080645**	**15.25774194**			3.65132771	5.64079826	6.89935442	
0.22626482	**1.327307692**		13.27307692	0	1	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	1	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	1	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	1	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	1	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	1	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	0	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	0	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	0	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	0	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	0	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	0	1		13.27307692				
0.22626482	**1.327307692**		13.27307692	0	0	1		13.27307692				
0.23113073	**1.355851944**		13.55851944	0	0	1		13.55851944				
0.23113073	**1.355851944**		13.55851944	0	0	1		13.55851944				
0.23113073	**1.355851944**		13.55851944	0	0	1		13.55851944				
0.23113073	**1.355851944**		13.55851944	0	0	1		13.55851944				
0.23113073	**1.355851944**		13.55851944	0	0	1		13.55851944				
0.23113073	**1.355851944**		13.55851944	0	0	1		13.55851944				
0.23113073	**1.355851944**		13.55851944	0	0	1		13.55851944				
0.24958234	**1.464092225**		17.5691067	0	0	1		17.5691067				
0.24958234	**1.464092225**		17.5691067	0	0	1		17.5691067				
0.24958234	**1.464092225**		17.5691067	0	0	1		17.5691067				
0.24958234	**1.464092225**		17.5691067	0	0	1		17.5691067				
0.24958234	**1.464092225**		17.5691067	0	0	1		17.5691067				
0.24958234	**1.464092225**		17.5691067	0	0	1		17.5691067				
0.24958234	**1.464092225**		17.5691067	0	0	1		17.5691067				
0.24958234	**1.464092225**		17.5691067	0	0	1		17.5691067				
0.24958234	**1.464092225**		17.5691067	0	1	1		17.5691067				
0.24958234	**1.464092225**		17.5691067	1	1	1		35.1382134				
0.24958234	**1.464092225**		17.5691067	1	1	1		35.1382134				
0.24958234	**1.464092225**		17.5691067	1	1	1		35.1382134				
0.24958234	**1.464092225**		17.5691067	1	1	1		35.1382134				
				4	**11**	**33**		**566.13445**				8.64633447
				5.8563689	**15.28430728**	**45.77916253**			19.2086115	20.3335033	20.7007478	
0.18063158	**1.059615385**		10.59615385	0	0	1		10.59615385				
0.18063158	**1.059615385**		10.59615385	0	0	1		10.59615385				

PAC	N920FT	B747-200F	*0.23482105*	**1.3775**		13.775	0	0	1		13.775				
PAC	N921FT	B747-200F	*0.23482105*	**1.3775**		13.775	0	0	1		13.775				
PAC	N922FT	B747-200F	*0.23482105*	**1.3775**		13.775	0	0	1		13.775				
PAC	N923FT	B747-200F	*0.23482105*	**1.3775**		13.775	0	0	1		13.775				
PAC	N354MC	B747-300F	*0.22626482*	**1.327307692**		13.27307692	0	0	1		13.27307692				
PAC	N355MC	B747-300F	*0.22626482*	**1.327307692**		13.27307692	0	0	1		13.27307692				
PAC	N450PA	B747-400F	*0.24432797*	**1.433269231**		17.19923077	0	0	1		17.19923077				
PAC	N451PA	B747-400F	*0.24432797*	**1.433269231**		17.19923077	0	0	1		17.19923077				
PAC	N452PA	B747-400F	*0.24432797*	**1.433269231**		17.19923077	0	1	1		17.19923077				
PAC	N453PA	B747-400F	*0.24432797*	**1.433269231**		17.19923077	0	1	1		17.19923077				
PAC	N454PA	B747-400F	*0.24958234*	**1.464092225**		17.5691067	1	1	1		35.1382134				
TOTAL ACFT, MV, & PERCENT							**1**	**3**	**12**		**199.3562903**				3.04468517
TOTAL B747-100F EQUIVALENTS (WBE)							**1.464092225**	**4.330630687**	**16.73928453**			4.80215288	5.76126165	7.56928891	
SOO	N742SA	B747-200F	*0.21010304*	**1.2325**		12.325	0	0	1		12.325				
SOO	N743SA	B747-200F	*0.21010304*	**1.2325**		12.325	0	1	1		12.325				
SOO	N744SA	B747-200F	*0.21010304*	**1.2325**		12.325	1	1	1		24.65				
TOTAL ACFT, MV, & PERCENT							**1**	**2**	**3**		**49.3**				0.75293826
TOTAL B747-100F EQUIVALENTS (WBE)							**1.2325**	**2.465**	**3.6975**			4.04254139	3.2793168	1.67196189	
UPS	N671UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	0	1		9.313461538				
UPS	N672UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	0	1		9.313461538				
UPS	N673UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	0	1		9.313461538				
UPS	N674UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	0	1		9.313461538				
UPS	N675UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	0	1		9.313461538				
UPS	N676UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	0	1		9.313461538				
UPS	N677UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	0	1		9.313461538				
UPS	N680UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	0	1		9.313461538				
UPS	N681UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	1	1		9.313461538				
UPS	N682UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	0	1	1		9.313461538				
UPS	N683UP	B747-100F	*0.15876565*	**0.931346154**		9.313461538	1	1	1		18.62692308				
TOTAL ACFT, MV, & PERCENT							**1**	**3**	**11**		**111.7615385**				1.70688719
TOTAL B747-100F EQUIVALENTS (WBE)							**0.931346154**	**2.794038462**	**10.24480769**			3.0547711	3.71705366	4.63257011	
WOA	N526MD	DC10-30CF	*0.1293044*	**0.758521505**		7.585215054	0	0	1		7.585215054				
WOA	N303WL	DC10-30CF	*0.13023465*	**0.763978495**		7.639784946	0	0	1		7.639784946				
WOA	N304WL	DC10-30CF	*0.13767663*	**0.807634409**		8.076344086	0	0	1		8.076344086				
WOA	N274WA	MD-11F	*0.17004924*	**0.997537634**		11.97045161	1	1	1		23.94090323				
WOA	N275WA	MD-11CF	*0.16558406*	**0.971344086**		11.65612903	0	1	1		11.65612903				
TOTAL ACFT, MV, & PERCENT							**1**	**2**	**5**		**58.89837634**				0.89953025
TOTAL B747-100F EQUIVALENTS (WBE)							**0.997537634**	**1.96888172**	**4.299016129**			3.271876	2.61930503	1.94395973	
CARGO TOTAL ACFT, MV, & PERCENT							**31**	**76**	**246**		**2705.591952**				**41.3213733**
TOTAL B747-100 EQUIVALENTS (WBE)							**30.4882469**	**75.16809595**	**221.1473856**			**100**	**100**	**100**	
				FY03 LONG-RANGE PASSENGER											
					As of 1 Oct 02										
												% OF	**% OF**	**% OF**	**% OF MV**
	FAA		***ACFT***	**B747-100**	**x 10 =**	**BASIC**					**FINAL**	**STAGE 1**	**STAGE 2**	**STAGE 3**	**CARGO**
	REG	**ACFT**	***MPM***	**EQUIV**	**or**	**ACFT**	**STAGE**	**STAGE**	**STAGE**		**ACFT**	**PAX**	**PAX**	**PAX**	**PAX**
CARRIER	**NUMBER**	**TYPE**	***CAP***	**FACTOR**	**x 12 =**	**MV**	**I**	**II**	**III**		**MV**	**WBE**	**WBE**	**WBE**	**AE**
AAL	N14065	A300-600ER	*0.25098*	**0.353348632**		3.533486322	0	1	1		3.533486322				
AAL	N14068	A300-600ER	*0.25098*	**0.353348632**		3.533486322	0	1	1		3.533486322				
AAL	N18066	A300-600ER	*0.25098*	**0.353348632**		3.533486322	0	1	1		3.533486322				
AAL	N25071	A300-600ER	*0.25098*	**0.353348632**		3.533486322	0	1	1		3.533486322				
AAL	N33069	A300-600ER	*0.25098*	**0.353348632**		3.533486322	0	1	1		3.533486322				
AAL	N70072	A300-600ER	*0.25098*	**0.353348632**		3.533486322	0	1	1		3.533486322				
AAL	N70073	A300-600ER	*0.25098*	**0.353348632**		3.533486322	0	1	1		3.533486322				

AAL	N355AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N39356	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N357AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N358AA	B767-300ER	0.4287575	0.603637247		6.036372468	0	0	1		6.036372468				
AAL	N359AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N360AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N361AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N362AA	B767-300ER	0.4287575	0.603637247		6.036372468	0	0	1		6.036372468				
AAL	N363AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N39364	B767-300ER	0.4287575	0.603637247		6.036372468	0	0	1		6.036372468				
AAL	N39365	B767-300ER	0.4287575	0.603637247		6.036372468	0	0	1		6.036372468				
AAL	N366AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N39367	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N368AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N369AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N370AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N371AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N372AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N373AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N374AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N7375A	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N376AN	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N377AN	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N378AN	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N379AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N380AN	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N381AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N382AN	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N383AN	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N384AA	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N385AM	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N386AM	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N387AM	B767-300ER	0.414117	0.583025243		5.830252432	0	0	1		5.830252432				
AAL	N388AA	B767-300ER	0.414117	0.583025243		5.830252432	0	1	1		5.830252432				
AAL	N389AA	B767-300ER	0.414117	0.583025243		5.830252432	0	1	1		5.830252432				
AAL	N390AA	B767-300ER	0.414117	0.583025243		5.830252432	0	1	1		5.830252432				
AAL	N391AA	B767-300ER	0.414117	0.583025243		5.830252432	0	1	1		5.830252432				
AAL	N392AN	B767-300ER	0.4287575	0.603637247		6.036372468	0	1	1		6.036372468				
AAL	N393AN	B767-300ER	0.4287575	0.603637247		6.036372468	0	1	1		6.036372468				
AAL	N394AN	B767-300ER	0.4287575	0.603637247		6.036372468	0	1	1		6.036372468				
AAL	N395AN	B767-300ER	0.4287575	0.603637247		6.036372468	0	1	1		6.036372468				
AAL	N396AN	B767-300ER	0.414117	0.583025243		5.830252432	0	1	1		5.830252432				
AAL	N397AN	B767-300ER	0.414117	0.583025243		5.830252432	0	1	1		5.830252432				
AAL	N398AN	B767-300ER	0.414117	0.583025243		5.830252432	1	1	1		11.66050486				
AAL	N399AN	B767-300ER	0.414117	0.583025243		5.830252432	1	1	1		11.66050486				
AAL	N770AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N771AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N772AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N773AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N774AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N775AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N776AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N777AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N778AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N779AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N780AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N781AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N782AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N783AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N784AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N785AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	0	1		8.056745836				
AAL	N786AN	B777-200ER	0.4768855	0.671395486		8.056745836	0	1	1		8.056745836				
AAL	N787AL	B777-200ER	0.4768855	0.671395486		8.056745836	1	1	1		16.11349167				
AAL	N788AN	B777-200ER	0.5239325	0.737631812		8.851581748	0	1	1		8.851581748				
AAL	N789AN	B777-200ER	0.5239325	0.737631812		8.851581748	0	1	1		8.851581748				
AAL	N790AN	B777-200ER	0.5239325	0.737631812		8.851581748	0	1	1		8.851581748				
AAL	N791AN	B777-200ER	0.5239325	0.737631812		8.851581748	1	1	1		17.7031635				
AAL	N792AN	B777-200ER	0.5239325	0.737631812		8.851581748	1	1	1		17.7031635				
TOTAL ACFT, MV, & PERCENT							5	29	100		633.1095665				9.66921739
TOTAL B747-100 EQUIVALENTS (WBE)							3.312709597	15.64318729	56.41425967			10.7844573	17.9068046	20.4498022	

AMT	N186AT	L1011-50	*0.2886975*	**0.406450182**		4.064501823	1	1	1		8.129003646				
AMT	N188AT	L1011-50	*0.2886975*	**0.406450182**		4.064501823	1	1	1		8.129003646				
AMT	N196AT	L1011-50	*0.2886975*	**0.406450182**		4.064501823	1	1	1		8.129003646				
AMT	N197AT	L1011-50	*0.2886975*	**0.406450182**		4.064501823	1	1	1		8.129003646				
AMT	N194AT	L1011-150	*0.372099*	**0.523869124**		5.238691239	1	1	1		10.47738248				
AMT	N195AT	L1011-100	*0.372099*	**0.523869124**		5.238691239	1	1	1		10.47738248				
AMT	N198AT	L1011-150	*0.372099*	**0.523869124**		5.238691239	1	1	1		10.47738248				
AMT	N160AT	L1011-500	*0.4768855*	**0.671395486**		6.713954864	1	1	1		13.42790973				
AMT	N161AT	L1011-500	*0.4768855*	**0.671395486**		6.713954864	1	1	1		13.42790973				
AMT	N162AT	L1011-500	*0.4768855*	**0.671395486**		6.713954864	1	1	1		13.42790973				
AMT	N163AT	L1011-500	*0.4768855*	**0.671395486**		6.713954864	1	1	1		13.42790973				
AMT	N164AT	L1011-500	*0.4768855*	**0.671395486**		6.713954864	1	1	1		13.42790973				
TOTAL ACFT, MV, & PERCENT							**15**	**17**	**37**		**229.5541962**				3.50588515
TOTAL B747-100 EQUIVALENTS (WBE)							**7.637458644**	**8.307100621**	**15.31796097**			24.8635881	9.50916365	5.55266121	
COA	N12109	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	1	1		3.784932915				
COA	N12114	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	1	1		3.784932915				
COA	N12116	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	1	1		3.784932915				
COA	N12125	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	1	1		3.784932915				
COA	N13110	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	1	1		3.784932915				
COA	N13113	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	1	1		3.784932915				
COA	N13138	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	1	1		3.784932915				
COA	N14102	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	1	1		3.784932915				
COA	N14106	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N14107	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N14115	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N14118	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N14120	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N14121	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N17104	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N17105	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N17122	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N17126	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N17128	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N17133	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N17139	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N18112	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N18119	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N19117	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N19130	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N19136	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N19141	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N21108	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N26123	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N29124	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N29129	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N33103	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N33132	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N34131	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N34137	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N41135	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N41140	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N48127	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N57111	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N58101	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N67134	B757-200ER	*0.26884*	**0.378493291**		3.784932915	0	0	1		3.784932915				
COA	N67157	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	0	1		4.946880851				
COA	N67158	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	0	1		4.946880851				
COA	N68155	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	0	1		4.946880851				
COA	N68159	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	0	1		4.946880851				
COA	N68160	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	0	1		4.946880851				
COA	N69154	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	0	1		4.946880851				
COA	N73152	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	0	1		4.946880851				
COA	N76151	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	1	1		4.946880851				
COA	N76153	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	1	1		4.946880851				
COA	N76156	B767-200ER	*0.351372*	**0.494688085**		4.946880851	0	1	1		4.946880851				
COA	N59053	B767-400ER	*0.4915025*	**0.691974405**		6.919744048	1	1	1		13.8394881				
COA	N66051	B767-400ER	*0.4915025*	**0.691974405**		6.919744048	1	1	1		13.8394881				
COA	N66056	B767-400ER	*0.4915025*	**0.691974405**		6.919744048	0	0	1		6.919744048				
COA	N66057	B767-400ER	*0.4915025*	**0.691974405**		6.919744048	0	0	1		6.919744048				
COA	N67052	B767-400ER	*0.4915025*	**0.691974405**		6.919744048	0	0	1		6.919744048				

TOTAL ACFT, MV, & PERCENT						**384.5134523**	**4**	**21**	**80**		**482.7330569**				7.3725799
TOTAL B747-100 EQUIVALENTS (WBE)							**2.882802095**	**11.89137254**	**42.48573963**			9.38490238	13.6120907	15.4008043	
DAL	N801DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N802DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N803DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N804DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N805DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N806DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N807DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N808DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N809DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N810DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N811DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N812DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	0	1		8.418034887				
DAL	N813DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	1	1		8.418034887				
DAL	N814DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	0	1	1		8.418034887				
DAL	N815DE	MD-11	*0.4982705*	**0.701502907**		8.418034887	1	1	1		16.83606977				
DAL	N1501P	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	0	1		5.741915274				
DAL	N152DL	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	0	1		5.741915274				
DAL	N153DL	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	0	1		5.741915274				
DAL	N154DL	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	0	1		5.741915274				
DAL	N155DL	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	0	1		5.741915274				
DAL	N156DL	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	0	1		5.741915274				
DAL	N1612T	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	0	1		5.741915274				
DAL	N176DN	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	0	1		5.741915274				
DAL	N177DN	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	0	1		5.741915274				
DAL	N178DN	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	1	1		5.741915274				
DAL	N179DN	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	1	1		5.741915274				
DAL	N180DN	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	1	1		5.741915274				
DAL	N181DN	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	0	1	1		5.741915274				
DAL	N182DN	B767-300ER	*0.4078425*	**0.574191527**		5.741915274	1	1	1		11.48383055				
DAL	N860DA	B777-200ER	*0.569922*	**0.80237931**		9.628551718	0	0	1		9.628551718				
DAL	N861DA	B777-200ER	*0.569922*	**0.80237931**		9.628551718	0	0	1		9.628551718				
DAL	N862DA	B777-200ER	*0.569922*	**0.80237931**		9.628551718	0	0	1		9.628551718				
DAL	N863DA	B777-200ER	*0.569922*	**0.80237931**		9.628551718	0	0	1		9.628551718				
DAL	N864DA	B777-200ER	*0.569922*	**0.80237931**		9.628551718	0	0	1		9.628551718				
DAL	N865DA	B777-200ER	*0.569922*	**0.80237931**		9.628551718	0	1	1		9.628551718				
DAL	N866DA	B777-200ER	*0.569922*	**0.80237931**		9.628551718	0	1	1		9.628551718				
DAL	N867DA	B777-200ER	*0.569922*	**0.80237931**		9.628551718	1	1	1		19.25710344				
TOTAL ACFT, MV, & PERCENT							**3**	**11**	**37**		**307.4742528**				4.69592555
TOTAL B747-100 EQUIVALENTS (WBE)							**2.078073745**	**7.382604288**	**24.98025947**			6.76512594	8.45088985	9.05518157	
HAL	N140AA	DC10-30	*0.5196555*	**0.731610328**		7.316103282	1	1	1		14.63220656				
HAL	N141AA	DC10-30	*0.5196555*	**0.731610328**		7.316103282	0	0	1		7.316103282				
HAL	N580HA	B767-300ER	*0.439215*	**0.618360106**		6.183601064	0	1	1		6.183601064				
HAL	N581HA	B767-300ER	*0.439215*	**0.618360106**		6.183601064	0	0	1		6.183601064				
TOTAL ACFT, MV, & PERCENT							**1**	**2**	**4**		**34.31551197**				0.52408645
TOTAL B747-100 EQUIVALENTS (WBE)							**0.731610328**	**1.349970435**	**2.699940869**			2.38174224	1.54531531	0.978711	
NAO	N752NA	B757-200ER	*0.241956*	**0.340643962**		3.406439623	0	0	1		3.406439623				
NAO	N754NA	B757-200ER	*0.241956*	**0.340643962**		3.406439623	1	1	1		6.812879247				
NAO	N756NA	B757-200ER	*0.241956*	**0.340643962**		3.406439623	1	1	1		6.812879247				
TOTAL ACFT, MV, & PERCENT							**2**	**2**	**3**		**17.03219812**				0.26012563
TOTAL B747-100 EQUIVALENTS (WBE)							**0.681287925**	**0.681287925**	**1.021931887**			2.2179187	0.77987238	0.37044366	
NWA	N211NW	DC10-30	*0.487578*	**0.686449197**		6.864491968	0	0	1		6.864491968				
NWA	N221NW	DC10-30	*0.487578*	**0.686449197**		6.864491968	0	0	1		6.864491968				
NWA	N223NW	DC10-30	*0.487578*	**0.686449197**		6.864491968	0	0	1		6.864491968				
NWA	N224NW	DC10-30	*0.487578*	**0.686449197**		6.864491968	0	0	1		6.864491968				
NWA	N225NW	DC10-30	*0.487578*	**0.686449197**		6.864491968	0	0	1		6.864491968				
NWA	N227NW	DC10-30	*0.487578*	**0.686449197**		6.864491968	0	0	1		6.864491968				
NWA	N229NW	DC10-30	*0.496132*	**0.698492165**		6.984921652	0	0	1		6.984921652				

NWA	N634US	B747-200	*0.751812*	**1.058457813**		10.58457813	0	0	1		10.58457813				
NWA	N635US	B747-200	*0.751812*	**1.058457813**		10.58457813	0	0	1		10.58457813				
NWA	N636US	B747-200	*0.769296*	**1.083073111**		10.83073111	0	1	1		10.83073111				
NWA	N637US	B747-200	*0.769296*	**1.083073111**		10.83073111	0	1	1		10.83073111				
NWA	N638US	B747-200	*0.769296*	**1.083073111**		10.83073111	1	1	1		21.66146222				
NWA	N641NW	B747-200	*0.751812*	**1.058457813**		10.58457813	0	1	1		10.58457813				
NWA	N642NW	B747-200	*0.751812*	**1.058457813**		10.58457813	0	1	1		10.58457813				
NWA	N661US	B747-400	*0.6928035*	**0.975381182**		11.70457419	1	1	1		23.40914838				
NWA	N662US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	1	1		11.70457419				
NWA	N663US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	1	1		11.70457419				
NWA	N664US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	1	1		11.70457419				
NWA	N665US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	1	1		11.70457419				
NWA	N666US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N667US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N668US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N669US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N670US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N671US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N672US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N673US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N674US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N675US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
NWA	N676US	B747-400	*0.6928035*	**0.975381182**		11.70457419	0	0	1		11.70457419				
TOTAL ACFT, MV, & PERCENT							**4**	**15**	**55**		**560.0775655**				8.55383021
TOTAL B747-100 EQUIVALENTS (WBE)							**3.40726675**	**13.61206127**	**49.28419378**			11.0922862	15.5817684	17.8651997	
OAE	N360AX	DC10-10	*0.2031575*	**0.286020499**		2.860204987	1	1	1		5.720409973				
OAE	N450AX	DC10-10	*0.2031575*	**0.286020499**		2.860204987	1	1	1		5.720409973				
OAE	N540AX	DC10-30	*0.6394115*	**0.900211885**		9.002118853	0	0	1		9.002118853				
OAE	N630AX	DC10-30	*0.6394115*	**0.900211885**		9.002118853	0	0	1		9.002118853				
OAE	N720AX	DC10-30	*0.6394115*	**0.900211885**		9.002118853	1	1	1		18.00423771				
TOTAL ACFT, MV, & PERCENT							**3**	**3**	**5**		**47.44929536**				0.72467323
TOTAL B747-100 EQUIVALENTS (WBE)							**1.472252883**	**1.472252883**	**3.272676653**			4.7928887	1.68529241	1.186324	
UAL	N104UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	1	1	1		22.25302341				
UAL	N105UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	1	1	1		22.25302341				
UAL	N106UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	1	1	1		22.25302341				
UAL	N107UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	1	1	1		22.25302341				
UAL	N108UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	1	1		11.12651171				
UAL	N109UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	1	1		11.12651171				
UAL	N116UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	1	1		11.12651171				
UAL	N117UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	1	1		11.12651171				
UAL	N118UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	1	1		11.12651171				
UAL	N119UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	1	1		11.12651171				
UAL	N120UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N121UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N122UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N127UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N128UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N171UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N172UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N173UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N174UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N175UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N182UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N192UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N195UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N196UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N197UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N198UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N199UA	B747-400	*0.6585875*	**0.927209309**		11.12651171	0	0	1		11.12651171				
UAL	N601UA	B767-200	*0.259346*	**0.36512692**		3.6512692	1	1	1		7.3025384				
UAL	N602UA	B767-200	*0.204967*	**0.28856805**		2.885680497	0	0	1		2.885680497				
UAL	N603UA	B767-200	*0.259346*	**0.36512692**		3.6512692	0	0	1		3.6512692				
UAL	N604UA	B767-200	*0.259346*	**0.36512692**		3.6512692	0	0	1		3.6512692				
UAL	N605UA	B767-200	*0.204967*	**0.28856805**		2.885680497	0	0	1		2.885680497				
UAL	N606UA	B767-200	*0.204967*	**0.28856805**		2.885680497	0	0	1		2.885680497				
UAL	N607UA	B767-200	*0.204967*	**0.28856805**		2.885680497	0	0	1		2.885680497				

UAL	N663UA	B767-300ER	*0.3952935*	**0.556524096**		5.565240958	0	0	1		5.565240958				
UAL	N209UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N210UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N211UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N212UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N216UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N217UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N218UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N219UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N220UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N221UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N226UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N227UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N766UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N767UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N768UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N771UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N774UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N776UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N778UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N779UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N780UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N781UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N784UA	B777-200ER	*0.519115*	**0.730849371**		8.770192457	0	0	1		8.770192457				
UAL	N785UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N786UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N787UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	0	1		9.329991975				
UAL	N789UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
UAL	N790UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
UAL	N791UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
UAL	N792UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
UAL	N793UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
UAL	N794UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
UAL	N795UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
UAL	N796UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
UAL	N797UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
UAL	N798UA	B777-200ER	*0.55225*	**0.777499331**		9.329991975	0	1	1		9.329991975				
TOTAL ACFT, MV, & PERCENT							**5**	**29**	**96**		**824.9645075**				12.5993376
TOTAL B747-100 EQUIVALENTS (WBE)							4.073964155	21.86440609	67.16909361			13.2627057	25.028253	24.3483595	
USA	N670UW	A330-323	*0.5076*	**0.714637683**		7.146376832	0	0	1		7.146376832				
USA	N671UW	A330-323	*0.5076*	**0.714637683**		7.146376832	0	0	1		7.146376832				
USA	N672UW	A330-323	*0.5076*	**0.714637683**		7.146376832	0	0	1		7.146376832				
USA	N673UW	A330-323	*0.5076*	**0.714637683**		7.146376832	0	0	1		7.146376832				
USA	N674UW	A330-323	*0.5076*	**0.714637683**		7.146376832	0	0	1		7.146376832				
USA	N675US	A330-323	*0.5076*	**0.714637683**		7.146376832	0	0	1		7.146376832				
USA	N676UW	A330-323	*0.5076*	**0.714637683**		7.146376832	0	1	1		7.146376832				
USA	N677UW	A330-323	*0.5076*	**0.714637683**		7.146376832	1	1	1		14.29275366				
USA	N678US	A330-323	*0.5076*	**0.714637683**		7.146376832	1	1	1		14.29275366				
TOTAL ACFT, MV, & PERCENT							**2**	**3**	**9**		**78.61014515**				1.20057984
TOTAL B747-100 EQUIVALENTS (WBE)							**1.429275366**	**2.14391305**	**6.431739149**			4.65297629	2.45414387	2.33146361	
WOA	N352WL	DC10-30	*0.5667025*	**0.797846654**		7.978466542	0	0	1		7.978466542				
WOA	N271WA	MD-11	*0.705705*	**0.99354489**		11.92253868	0	0	1		11.92253868				
WOA	N272WA	MD-11	*0.705705*	**0.99354489**		11.92253868	0	0	1		11.92253868				
WOA	N273WA	MD-11	*0.705705*	**0.99354489**		11.92253868	0	0	1		11.92253868				
WOA	N276WA	MD-11	*0.705705*	**0.99354489**		11.92253868	1	1	1		23.84507736				
WOA	N277WA	MD-11ER	*0.7163975*	**1.008598601**		12.10318321	1	1	1		24.20636641				
WOA	N278WA	MD-11ER	*0.7163975*	**1.008598601**		12.10318321	1	1	1		24.20636641				
TOTAL ACFT, MV, & PERCENT							**3**	**3**	**7**		**116.0038928**				1.77167889
TOTAL B747-100 EQUIVALENTS (WBE)							**3.010742091**	**3.010742091**	**6.789223416**			9.80140839	3.44640574	2.46104933	
PASSENGER TOTAL ACFT, MV, & PERCENT							**47**	**135**	**433**		**3331.324189**				**50.8779198**
TOTAL B747-100 EQUIVALENTS (WBE)							**30.71744358**	**87.35889848**	**275.8670191**			**100**	**100**	**100**	

DAL	N174DN	B767-300ER	0.4078425	0.574191527		11.48383055		1	1		11.48383055				
DAL	N175DN	B767-300ER	0.4078425	0.574191527		11.48383055		1	1		11.48383055				
DAL	N183DN	B767-300ER	0.4078425	0.574191527		11.48383055		1	1		11.48383055				
DAL	N184DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N185DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N186DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N187DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N188DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N189DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N190DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N191DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N192DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N193DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N194DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N195DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N196DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N197DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N198DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
DAL	N199DN	B767-300ER	0.4078425	0.574191527		11.48383055		0	1		11.48383055				
TOTAL ACFT, MV, & PERCENT								19	35		401.9340692				6.13857079
TOTAL B747-100 EQUIVALENTS (WBE)								10.90963902	20.09670346				42.7187824	78.6924939	
USA	N645US	B767-200ER	0.351372	0.494688085		9.893761703		1	1		9.893761703				
USA	N646US	B767-200ER	0.351372	0.494688085		9.893761703		1	1		9.893761703				
USA	N647US	B767-200ER	0.351372	0.494688085		9.893761703		1	1		9.893761703				
USA	N648US	B767-200ER	0.351372	0.494688085		9.893761703		1	1		9.893761703				
USA	N649US	B767-200ER	0.351372	0.494688085		9.893761703		1	1		9.893761703				
USA	N650US	B767-200ER	0.351372	0.494688085		9.893761703		1	1		9.893761703				
USA	N651US	B767-200ER	0.351372	0.494688085		9.893761703		0	1		9.893761703				
USA	N652US	B767-200ER	0.351372	0.494688085		9.893761703		0	1		9.893761703				
USA	N653US	B767-200ER	0.351372	0.494688085		9.893761703		0	1		9.893761703				
USA	N655US	B767-200ER	0.351372	0.494688085		9.893761703		0	1		9.893761703				
USA	N656US	B767-200ER	0.351372	0.494688085		9.893761703		0	1		9.893761703				
TOTAL ACFT, MV, & PERCENT								6	11		108.8313787				1.66213609
TOTAL B747-100 EQUIVALENTS (WBE)								2.968128511	5.441568937				11.622276	21.3075061	
AEROMEDICAL TOTAL ACFT, MV, & PERCENT								25	46		510.7654479				7.80070688
TOTAL B747-100 EQUIVALENTS (WBE)								13.87776753	25.5382724				54.3410585	100	
TOTAL CARGO MV						2705.591952									
TOTAL PASSENGER MV						3331.324189									
TOTAL PASSENGER & CARGO MV						6036.91614									
TOTAL AEROMEDICAL MV						510.7654479									
TOTAL PASSENGER & AEROMEDICAL MV						3842.089637									
TOTAL PASSENGER & CARGO & AEROMEDICAL MV						6547.681588									
TOTAL DOLLARS AWARDED					$	0									
DOLLARS PER MV POINT					$	0									
TOTAL CARGO B747-100F EQUIVALENTS (WBE)						221.1473856									
PERCENT OF EQUIV IN STAGE ONE						13.78639264									
TOTAL PASSENGER B747-100 EQUIVALENTS (WBE)						275.8670191	%								
PERCENT OF EQUIV IN STAGE ONE						11.13487349	%								

Chapter II: ATTACHMENT B

Airline	2001 Annual Revenue (millions)	Approximate AMC Int'l Pax Charter Revenue	AMC as Percentage of Total
United	16,138	0	0%
American	14,766	0	0%
Delta	13,879	0	0%
Northwest	9,905	0	0%
Continental	8,969	0	0%
USAirways	8,288	0	0%
American Trans Air	1,275	135	11%
World	318	190	60%
Omni	104	25	24%
Totals	73,642	350	0.5%

Issues Surrounding Linkage of CRAF and GSA City Pair Passenger Contracts:

Summary of Issues

The GSA's city pair contracting methodology does not contemplate the anticipated value of each carrier's CRAF pledge as viewed from a war planning (or mobilization value) perspective. Thus there is minimal direct linkage between the size, composition and wartime utility of a carrier's CRAF pledge and the carrier's actual annual GSA city pair revenue.

The issue may be subdivided as follows:

1) The GSA methodology does not differentiate between carriers of varying fleet sizes.
2) The GSA methodology does not differentiate between aircraft types.
3) The GSA methodology does not provide incentive for participation above a 30 percent threshold.
4) US domestic carriers (lacking long-haul international fleets) are eligible for GSA traffic without participation in CRAF
5) A significant percentage of Government travelers elect to not utilize the GSA contracted air carrier

Ballpark Quantification of Some Inequities: The 6 Largest US Airlines

USAirways receives an estimated 2.1 times more GSA revenue per CRAF mobilization point than does American. American receives 10 percent more than Delta. Delta receives 76 percent more than United. United receives 54 percent more than Northwest and Northwest receives 96 percent more than Continental.

Comparing the highest and the lowest, USAirways receives more than 12 times more GSA revenue per CRAF mobilization point than does Continental.

GSA Issue Synopsis Part 1

The GSA methodology does not differentiate between carriers of varying fleet sizes.

In order to be eligible to bid for annual GSA city pair contracts, US passenger carriers are required to have a least 30 percent of their eligible aircraft pledged to the CRAF.

Once the 30 percent eligibility threshold is met, GSA awards its annual contracts based on elapsed transit time parameters, service frequency and price bidding. The system does not contemplate the anticipated relative value of each carrier's CRAF pledge from a war planning (or mobilization value) perspective.

For example, in order to be eligible to seek GSA awards, midsize Carrier A may pledge 5 of its 15 aircraft to the CRAF and major Carrier B may pledge 50 of its 150 aircraft to the CRAF.

From a DoD war planning (mobilization value) perspective, Carrier B's 50 CRAF aircraft may be approximately ten times more valuable than Carrier A's 5 CRAF aircraft, however, under the GSA city pair contracting system, this differential is not acknowledged.

Carrier A and Carrier B may both offer daily non-stop service for a route over which GSA forecasts to move 5,000 passengers per year. Carrier A may bid $299/seat and Carrier B may bid $300/seat. Under such a scenario, despite its pledge of ten times as many CRAF aircraft, Carrier B may lose the particular city pair contract (and approximately $1,500,000) in annual revenue to carrier A as a result of a $1 difference in their bid.

Thus, the GSA system fails to proportionately reward CRAF participation.

GSA Issue Synopsis Part 2

The GSA methodology does not differentiate based on aircraft type.

Carrier C may have a fleet of 40 modestly capable wide-body aircraft (such as 767-200ER) and may pledge 12 aircraft (30 percent). Carrier D may have a fleet of 40 highly capable wide-body aircraft (such as 747-200 and 747-400) and may pledge 12 aircraft (30 percent).

AMC analysis indicates that, during CRAF activation, the anticipated utility of a 747-200 or a 747-400 aircraft is more than double that of a 767-200ER aircraft.

From a GSA contract fare perspective, both carriers would meet the 30 percent CRAF participation threshold and both would be equally eligible to receive GSA city pair contract awards.

From a military deployment (or mobilization value) perspective, Carrier D's CRAF pledge would be more than twice as valuable to the US Government, however, the GSA contracting system does not contemplate anticipated wartime capability. In awarding its GSA city pair contracts, GSA would give no preference to Carrier D as a result of its higher-capability fleet.

Thus, the GSA system fails to proportionately reward anticipated CRAF operations capability.

GSA Issue Synopsis Part 3

The GSA methodology does not provide incentive for CRAF participation above a 30 percent threshold.

As noted above, in order to be eligible to bid for annual GSA city pair contracts, US passenger carriers are required to have a least 30 percent of their eligible aircraft pledged to the CRAF.

Carriers E and F may have identical fleets of 20 wide-body passenger aircraft. Carrier E may pledge 6 or the aircraft to the CRAF (30 percent). Carrier F may contemplate pledging all 20 of its aircraft (100 percent).

From a military deployment (or mobilization value) perspective, Carrier F's pledge of 20 aircraft would be significantly more valuable to the US Government than would Carrier E's pledge of 6 aircraft, however, the GSA contracting system does not contemplate anticipated wartime capability. When bidding against Carrier E (or any other GSA carrier), Carrier F would not receive any GSA-related benefit resulting from pledging additional aircraft. Carrier F (with its 100 percent pledge) could lose a multi-million dollar GSA contract to Carrier E (with its 30 percent pledge) over a $1/seat price bid variance.

Thus, the GSA system fails to provide any incremental reward to those carriers that might be willing to exceed GSA's 30 percent minimum CRAF participation requirement.

GSA Issue Synopsis Part 4

Domestic US carriers, whose fleets do not include long-haul aircraft, are not required to pledge 30 percent of their fleets to the CRAF program in order to establish eligibility to receive GSA city pair contracts.

Continental Airlines comprises approximately 13 percent of the international passenger CRAF. Southwest Airlines is not in the CRAF. GSA FY03 estimates indicate that Southwest Airlines will receive approximately 25 percent more GSA city pair revenue than will Continental.

For those GSA routes where the two carriers compete, Continental receives no preference versus its non-CRAF competitor and therefore receives no fiscal consideration in exchange for its CRAF participation.

GSA's fiscal year 2003 city pair contract award press release indicates that non-CRAF carriers will receive over $100,000,000 in GSA city pair traffic during fiscal year 2003.

Thus, as evaluated versus the anticipated wartime utility of its US flag air carriers, the GSA city pair system provides inequitable compensation.

GSA Issue Synopsis Part 5

Many Government travelers elect to not utilize GSA's contracted airline.

Airlines need not receive a GSA contract to pursue Government traffic. Airlines not having a GSA contract for a certain city pair may match or undercut a published GSA fare at will. US airlines do not need to be in CRAF to match or undercut published GSA city pair fair. Many carriers will offer lower cost government airfares in limiting seating inventory classes.

Effectively, published GSA city pair fares function as an upper price limit, not a lower price limit or a fixed firm price.

It is estimated that approximately 40 percent (or over $400 million per year) of "would-be" GSA city pair traffic spills out of the city pair contract system and travels on alternative fares.

Thus, by failing to mandate that its travelers utilize the GSA contracted city pair airlines, the Government fails to provide an equitable reward for those carriers that elect to participate in CRAF and are subsequently awarded GSA city pair contracts.

10 Reasons Why the Major Passenger Airlines Do Not Fly AMC Peacetime Passenger Charters:

- The volume and frequency of AMC passenger charter operations fluctuates significantly from week to week, month to month and year to year. The market involves extensive revenue uncertainty.
- Relative to the international scheduled service networks of the major passenger carriers, the AMC passenger charter market is extremely small. The entire AMC passenger charter market can only support a handful of aircraft.
- AMC's passenger charter routes involve extreme geographic decentralization and involve significant crew, catering, ground handling and maintenance inefficiencies. The union work rules at the major airlines compound the costs associated with non-geographically focused operations.
- The vast majority of AMC passenger charter operations are "offline" (they do not transit the airports normally utilized for commercial service. Offline operations require a disproportionate amount of management attention. For a major airline, offline operations must produce significantly superior economic returns to justify their pursuit.
- AMC purchases a significant portion of its passenger charters ad hoc on relatively short notice. The major passenger airlines' planning, scheduling, operations and union structures are not designed or well-suited for ad hoc operations. Unless an organization has personnel allocated specifically for ad hoc operations, such operations distract personnel from their primary functions. Such distraction is only justifiable if it creates significantly superior economic returns.
- AMC's pricing and payment methodology rewards an "all-coach" seating configuration – which is not commonly utilized for international scheduled service operations. AMC charters have no requirement for, and offer no additional compensation for, first class or business class seating. The major passenger carriers are not interested in creating "sub-fleets" by reconfiguring aircraft specifically to pursue the relatively small AMC market.
- The AMC rate methodology keeps AMC pricing below the cost level for the many major carriers
- Team formation is needed to achieve significant market share. Even with significant market share, AMC charter aircraft utilization is far below that obtained via the major airlines' international scheduled service.
- Teaming commissions are excluded from the rate; thus the profit margin for AMC operations is marginal at best.
- Smaller "supplemental" passenger carriers have, thus far, been willing to pay attractive commission rates to their AMC team partners. Thus the major passenger carriers can join a team and make an AMC profit without flying – and can focus their attention and their resources on their primary product lines.

III. EVALUATING CRAF ALTERNATIVES

This chapter provides details of the process that evolved from the "recommendations" we received from CRAF airline managers, and information we collected from DoD personnel involved with the CRAF program and that which we found through our research of GAO and other studies, along with information developed by our study teams.

A few weeks into our study, we had tabulated hundreds of recommendations. It was in the MBA charter to find a method for analyzing these recommendations in order to determine those most effective and feasible. The process we developed had the following goals:

(1) To develop and document a process that would serve as a guide in addressing the alternatives recommend by any study team
(2) To develop a process which can prioritize alternatives according to their effectiveness (impact)
(3) To develop a process which can prioritize alternative according to the feasibility of implementation
(4) To develop a process which can prioritize alternative according to the overall Power (feasibility X effectiveness) of an alternative.

The model in this chapter provides the decision maker with a structure and a method for evaluating the impact of various alternatives strategies on the CRAF program. The model assesses the overall effectiveness of each proposed strategy; it also requires the user to make a judgment on the current feasibility, or potential for implementation, of each proposed strategy. Each user can weight the effectiveness and the feasibility so as to derive a prioritized list based on a calculated combination of Power, Confidence, and Applicability scores.

Definitions:

Problem Statement: A description of the issue, a description of a deficiency, or a description of a latent reason why something might have occurred or failed to occur.

Effectiveness: A measure of the potential impact of an alternative based on the breadth and depth of its relative potential alternative to meet the program goals such as assuring safe and reliable operations, achieving the desired level of participation, attracting wartime/peacetime capability at a reasonable cost, and fostering cooperation between DoD and industry.

Feasibility: A measure of the current potential for widespread implementation of an alternative considering such factors as funding, ability for AMC to act, operational practicality, selected timeframe, goals of the political system, and perspective of the airline industry.

Alternative/Recommendation: A plan to prevent, improve, or mitigate the issue.

The software program[40] is intended to be used by the facilitator to compile the efforts and judgments of an expert team. For any subsequent team seeking solutions to CRAF program issues, we believe the model provides a rigorous and sound process. However, MBA makes no claim to perfection or finality in the printed examples provided. (Note: this model is on a separate disk, and is best used in a conference setting with an expert operator. It also should be used in conjunction with the economic model provided by GRA in Appendix C.)

Three examples of the analysis using this model follow:

[40] A copy of the software program is available by contacting mbs@mba-consulting.com

EXAMPLE 1

PROBLEM STATEMENT:

SOME LONG-STANDING CRAF CARRIERS WITH SIGNIFICANT CAPABILITY ARE IN PRECARIOUS FINANCIAL CONDITION AND MAY NOT BE AVAILABLE TO DOD THROUGH THE YEAR 2010.

Institute for Defense Analyses
Task Order AL-6-2181
DoD Access to Commercial Aviation Assets

PROJECT PROBLEM STATEMENTS

PREFACE

Morten Beyer & Agnew was contracted to study and develop alternatives to the existing Civil Reserve Air Fleet (CRAF) to assure continued Department of Defense (DoD) access to civil air assets during national defense emergencies through the year 2010. MBA has used the information from industry sessions, interviews with experts and our own experience to develop a comprehensive list of CRAF program issues.

PROBLEM STATEMENT

1 Some long standing CRAF Carriers with significant capability are in precarious financial condition and may not be available to the DoD through the year 2010

PROBLEM BACKGROUND & DESCRIPTION

The financial health of the US airline industry is in fragile condition due to the economic downturn. The US industry will continue to consolidate, thus one or more of the major airlines that participate in CRAF are liekely to disappear.

INTERESTED PARTIES

DoD, DoT, ATA, NACA, Air Carriers

URGENCY

Medium for DoD

CRITERIA FOR MEASURING SUCCESSFUL OPTIONS

RATING IMPACT OR EFFECTIVENESS

(E1) Assure Safe & Reliable Civil Operations

3 Attractive to safe, high quality operators
2 Attractive to operators with occasional quality and safety issues
1 Requires significant DoD effort to assure quality and safety

(E2) Will Attract Near-Term CRAF Capability

3 Capability remains well above targets
2 Capability is within plus/minus 10% of target
1 Capability likely to drift well below target

(E3) Will Facilitate CRAF Capability Over the Long Term

3 Capability remains well above targets
2 Capability is within plus/minus 10% of target
1 Capability likely to drift well below target

(E4) Provides Wartime Capability At Reasonable Cost

3 Wartime costs remain within 10% of peacetime
2 Wartime costs remain within 25% of peacetime
1 Wartime costs over 25% of peacetime

(E5) Provides Peacetime Capability At Reasonable Cost

3 Costs increase near inflation rates
2 Costs increase well above inflation rate
1 Service not available at reasonable costs

(E6) Fosters Cooperation Between DoD And Civil Industry

3 Participation attractive, full cooperation relationship
2 Participation uncertain by some carriers; issues constructively solved
1 Participation declining; issues ignored or appear unsolved

RATING THE FEASIBILITY OF ALTERNATIVES

(F1) PROGRAM FEASIBILITY: The ability for USTRANSCOM or AMC to act on the option

3 Can be implemented using existing policy and authority
2 Requires adjustment to current policy and/or authority
1 Requires new policy or legislation

(F2) FINANCIAL FEASIBILITY: The ability for DoD to fund the option

3 Can be implemented within current budget or will save dollars
2 May require a significant increase in budget over time (5 years)
1 Exceeds current budgetary authority

(F3) OPERATIONAL FEASIBILITY: The "practicality" of the option within the context of the operational capability of the organic and civil fleets

3 Minimal changes to military or civil roles and responsibilities
2 Modest changes to military or civil roles and responsibilities
1 Major changes to operating environment

(F4) TIMETABLE FEASIBILITY: The ability of the option to contribute to solving the issue in a selected timeframe

3 Less than 2 years to full implementation
2 Full implementation in 2-5 years
1 Longer than 5 years to full implementation

(F5) SOCIOLOGICAL/POLITICAL FEASIBILITY: Requires evaluation of the compatibility of the option with the prevailing goals of the political system

3 Positive push from political system
2 Neutral
1 Negative

(F6) INDUSTRIAL FEASIBILITY: Affordable and feasible from the perspective of the airline industry

3 Positive reception from the airline industry
2 Requires some adjustment from the airline industry
1 Additional investment and consideration required

COMPARATIVE SUMMARY

PROBLEM STATEMENT

Some long standing CRAF Carriers with significant capability are in precarious financial condition and may not be available to the DoD through the year 2010

ALTERNATIVE OPTIONS SORTED BY OVERALL RATING, EFECTIVENESS, AND FEASIBILITY

8 DoD and GSA should take steps to eliminate the "spillage" of government travel to non CRAF carriers

2 It may benefit the CRAF program and the carriers to allow carriers to earn more than 40% of their revenue from DoD for up to 36 months.

3 In order to provide additional revenue to this critical industry, the DoD should take steps to rely on civil carriers for all requirements for which they are able and willing to fly.

9 DoD should allow industry to participate in the aerial port pallet build activity so as to allow better use of civil cargo lift.

6 In order to assure continued access during bankrupcy, mergers and acqusition, the DoD should consider negotiating longer term (multi year, multiple year contracts)

1 No adjustments are made to the CRAF program in response to the current industry economic crises

5 For a limited period of time, the DOD should adjust the AMC peacetime rate to a level that is attactive for major carrier participation (compensates carrier for the "infrastructure" the major carriers can provide.

4 DOT and DOS should take steps to prevent foreign carriers from forming long term contracts with the customers of US carriers during an activation

10 In order to eliminate the burden of comissions, the DoD should disallow the cross utilization of mobilization value points between cargo and passenger operators

7 DoD should lend or lease military airlift aircraft to commercial and foreign governments -- conditioned recall during contingencies

				Effectiveness						Feasibility					
Alternative	**Overall Rating**	Effectiveness	Feasibility	E1	E2	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6
8	7.5	3.0	2.5	3	3	3	3	3	3	3	3	3	2	2	2
2	6.7	2.7	2.5	1	3	3	3	3	3	2	3	3	2	2	2
3	6.6	2.8	2.3	3	3	3	3	2	3	2	1	3	2	2	2
9	6.6	2.8	2.3	2	3	3	3	3	3	3	3	2	2	2	2
6	6.3	2.5	2.5	3	2	2	3	3	2	3	3	3	2	2	2
1	6.2	2.3	2.7	2	2	2	3	3	2	3	3	2	2	2	2
5	6.1	2.8	2.2	3	3	3	3	2	3	3	1	3	1	1	1
4	6.0	3.0	2.0	3	3	3	3	3	3	1	3	3	1	1	1
10	5.8	2.3	2.5	2	2	2	3	3	2	2	3	3	2	2	2
7	4.0	2.2	1.8	2	2	2	3	2	2	2	2	2	2	2	2

EXAMPLE 2

PROBLEM STATEMENT:

PRESENT SECURITY POLICY DOES NOT ADEQUATELY ADDRESS THE APPROPRIATE ROLE OF CIVIL AIRLIFT FOR MILITARY TRANSPORT DURING PERIODS OF POLITICAL AMBIGUITY, OR INTO HIGH THREAT REGIONS, OR FOR MAXIMIZING CIVIL CAPABILITY TO TRANSPORT CARGO.

Institute for Defense Analyses
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DoD Access to Commercial Aviation Assets

PROJECT PROBLEM STATEMENTS

PREFACE

Morten Beyer & Agnew was contracted to study and develop alternatives to the existing Civil Reserve Air Fleet (CRAF) to assure continued Department of Defense (DoD) access to civil air assets during national defense emergencies through the year 2010. MBA has used the information from industry sessions, interviews with experts and our own experience to develop a comprehensive list of CRAF program issues.

PROBLEM STATEMENT

2 Present security policy does not adequately address the appropriate role of civil airlift for military transport during periods of political ambiguity, or into high threat regions, or for maximizing civil capability to transport cargo

PROBLEM BACKGROUND & DESCRIPTION

he current National Airlift Policy (NSDD Number 280) was approved in June of 1987 by President Ronald Regan. Since that time the global polictical situation has changed significantly, along with the US military mobility strategy, mission and operating environment. The shape of existing CRAF program are governened by this policy. In determining the appropriate use of civil lift, it must be recognized that:
--US civil aircraft not equipped with defensive capability
--US civil crews not hired or trained to accept exposure to combat risk
--US civil scheduling and coordination systems depend upon wide dissemination of potentially sensitive information
--CRAF airlift is completely dependent upon voluntary crews
--Supply of volunteer flight crew is dependent upon perception of risk and political popularity of military action
--Civil lift may be highly capable and reliable for transport to interim military staging points
--Reliance upon civil lift for forward deployment (into military risk zone) may be inappropriate and inadvisable

INTERESTED PARTIES

DoD, DoT, ATA, NACA, Air Carriers

URGENCY

Due to the present threat of a regional war in the middle east -- high

CRITERIA FOR MEASURING SUCCESSFUL OPTIONS

RATING IMPACT OR EFFECTIVENESS

(E1) Assure Safe & Reliable Civil Operations

3 Attractive to safe, high quality operators
2 Attractive to operators with occasional quality and safety issues
1 Requires significant DoD effort to assure quality and safety

(E2) Will Attract Near-Term CRAF Capability

3 Capability remains well above targets
2 Capability is within plus/minus 10% of target
1 Capability likely to drift well below target

(E3) Will Facilitate CRAF Capability Over the Long Term

3 Capability remains well above targets
2 Capability is within plus/minus 10% of target
1 Capability likely to drift well below target

(E4) Provides Wartime Capability At Reasonable Cost

3 Wartime costs remain within 10% of peacetime
2 Wartime costs remain within 25% of peacetime
1 Wartime costs over 25% of peacetime

(E5) Provides Peacetime Capability At Reasonable Cost

3 Costs increase near inflation rates
2 Costs increase well above inflation rate
1 Service not available at reasonable costs

(E6) Fosters Cooperation Between DoD And Civil Industry

3 Participation attractive, full cooperation relationship
2 Participation uncertain by some carriers; issues constructively solved
1 Participation declining; issues ignored or appear unsolved

RATING THE FEASIBILITY OF ALTERNATIVES

(F1) PROGRAM FEASIBILITY: The ability for USTRANSCOM or AMC to act on the option

3 Can be implemented using existing policy and authority
2 Requires adjustment to current policy and/or authority
1 Requires new policy or legislation

(F2) FINANCIAL FEASIBILITY: The ability for DoD to fund the option

3 Can be implemented within current budget or will save dollars
2 May require a significant increase in budget over time (5 years)
1 Exceeds current budgetary authority

(F3) OPERATIONAL FEASIBILITY: The "practicality" of the option within the context of the operational capability of the organic and civil fleets

3 Minimal changes to military or civil roles and responsibilities
2 Modest changes to military or civil roles and responsibilities
1 Major changes to operating environment

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3 Less than 2 years to full implementation
2 Full implementation in 2-5 years
1 Longer than 5 years to full implementation

(F5) SOCIOLOGICAL/POLITICAL FEASIBILITY: Requires evaluation of the compatibility of the option with the prevailing goals of the political system

3 Positive push from political system
2 Neutral
1 Negative

(F6) INDUSTRIAL FEASIBILITY: Affordable and feasible from the perspective of the airline industry

3 Positive reception from the airline industry
2 Requires some adjustment from the airline industry
1 Additional investment and consideration required

Comparative Summary

PROBLEM STATEMENT

Present security policy does not adequately address the appropriate role of civil airlift for military transport during periods of political ambiguity, or into high threat regions, or for maximizing civil capability to transport cargo

ALTERNATIVE OPTIONS SORTED BY OVERALL RATING, EFECTIVENESS, AND FEASIBILITY

9 As an incentive to volunteer for CRAF operations , the DoD should arrange for combat theatre tax exemptions for commercial flight crews.

7 D0D should provide flight crews with life insurance and enhanced medical beneifits during an activation

3 DoD should equip commercial cargo and passenger aircraft with defensive systems and secure communications

5 DoD should consider using reserve or special volunteer crew members for high threat operations

4 DoD should consider a commercial ready reserve fleet operated by military reserve or volunteer contractor crew members

10 The DoD should contract with several "specialized" carriers that are organzied and trained to operate into higher threat envirnments.

8 DoD shuld consider lending or leasing organic outsized/oversized cargo aircraft to commercial operatiors and foreign governments -- conditioned on availibility for recall by DoD

1 DoD should own and operate enough passenger capable aircraft to meet in-theatre requirements

2 DoD should own and operate enough cargo capable aircraft to meet in-threatre requirements

6 DoD and DoT should allow the use of Foreign Flag Carriers (at the negotiated rates) for troops when US Industry cannot or will not meet the requirement

				Effectiveness						Feasibility					
Alternative	**Overall Rating**	Effectiveness	Feasibility	E1	E2	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6
9	7.5	3.0	2.5	3	3	3	3	3	3	1	2	3	3	3	3
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3	6.5	3.0	2.2	3	3	3	3	3	3	3	2	2	2	2	2
5	6.0	3.0	2.0	3	3	3	3	3	3	2	2	2	2	2	2
4	6.0	3.0	2.0	3	3	3	3	3	3	2	2	2	2	2	2
10	5.3	2.7	2.0	2	2	3	3	3	3	3	2	2	2	2	2
8	5.0	3.0	1.7	3	3	3	3	3	3	2	1	2	2	2	2
1	4.9	2.7	1.8	3	2	3	3	3	2	1	2	2	2	2	2
2	4.6	2.5	1.8	3	2	3	2	3	2	1	2	2	2	2	2
6	4.4	2.7	1.7	2	3	3	3	3	2	1	3	1	1	1	1

EXAMPLE 3

PROBLEM STATEMENT:

THE EFFECTIVENESS AND EQUITY OF CRAF PARTICIPATION INCENTIVES SHOULD BE IMPROVED. ADDITIONALLY, DOD PLANNERS DO NOT APPEAR TO HAVE AN ADEQUATE MECHANISM FOR INCLUDING INDUSTRY IN THE STRATEGIC AND TACTICAL PLANNING PROCESSES SO AS TO ACHIEVE THE MOST EFFECTIVE USE OF CIVIL CAPABILITY PRIOR TO AND DURING CONTINGENCIES.

Institute for Defense Analyses
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DoD Access to Commercial Aviation Assets

PROJECT PROBLEM STATEMENTS

PREFACE

Morten Beyer & Agnew was contracted to study and develop alternatives to the existing Civil Reserve Air Fleet (CRAF) t assure continued Department of Defense (DoD) access to civil air assets during national defense emergencies through th year 2010. MBA has used the information from industry sessions, interviews with experts and our own experience t develop a comprehensive list of CRAF program issues.

PROBLEM STATEMENT

3 The effectiveness and equity of CRAF Participation Incentives should be improved. Additionally, DoD planner do not appear to have an adequate mechanism for including industry in the strategic and tactical plannin processes so as to achieve the most effective use of civil capability prior to and during contingencies.

PROBLEM BACKGROUND & DESCRIPTION

We found the following: -
Mismatch Between Peacetime AMC Traffic and Business Focus of Network Passenger and Integrated Carriers.
-Inequitable Compensation: 70% of "CRAF-Linked" Traffic not Distributed Based on MV (GSA City Pairs, Domestic Military Charters, Worldwide Express Cargo, Domestic Express Cargo)
-Inequitable Compensation: Distribution of Remaining 30% is Determined by AMC Teams
-Inequitable Compensation, Mobilization Values and Entitlement: Cargo/Passenger/Cargo Crossover Entitlement. CRAF Stage III Over-subscription. Mobilization Value Weighting Sequence
-A review of past contingencies reveals a tendency for DoD to use organic lift during the buildup and sustainment for requirements that could be met by civil lift. Therefore, the ability to surge the tempo of organic lift during the conflict (when use of civil lift is not feasable) may be compromised, along with an increas in the propensity to activate CRAF.
Depending on the size and mission of the air carrier, the current procurement method is complex and ineqatable, which puts particapation during peactime and wartime at risk.

INTERESTED PARTIES

DoD, DoT, ATA, NACA, Air Carriers

URGENCY

Medium for DoD

CRITERIA FOR MEASURING SUCCESSFUL OPTIONS

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RATING THE FEASIBILITY OF ALTERNATIVES

(F1) PROGRAM FEASIBILITY: The ability for USTRANSCOM or AMC to act on the option

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2 Neutral
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(F6) INDUSTRIAL FEASIBILITY: Affordable and feasible from the perspective of the airline industry

3 Positive reception from the airline industry
2 Requires some adjustment from the airline industry
1 Additional investment and consideration required

Comparative Summary

PROBLEM STATEMENT

The effectiveness and equity of CRAF Participation Incentives should be improved. Additionally, DoD planners do not appear to have an adequate mechanism for including industry in the strategic and tactical planning processes so as to achieve the most effective use of civil capability prior to and during contingencies.

ALTERNATIVE OPTIONS SORTED BY OVERALL RATING, EFECTIVENESS, AND FEASIBILITY

6 DoD should begin adjusting plans to reflect an increased reliance on smaller aircraft and prepare to encorporate the A380 aircraft into its planning.

8 In all situations short of a national mobilization, the DoD should eliminate "rates" from their procurement process and rely on market.

7 In order to taylor the use of civil for the specific operation, the DoD should eliminate the "Stages" and "Segments" of CRAF and devlop a system based on conflict specific requirements.

3 Just prior to commencing operations, the civil industry should stand up a "control cell" with trained staffing and the necessary communications links to the military operations centers and the individual carrier operations facilities

2 DoD should be prepared to provide additional security at key location s for civil air flight operations

1 Representative of the civil aviation industry should particpate in the planning and scenario simulation/evaluation process

11 The primary incentive for a large majority CRAF participation is not controlled by DoD or USTRANSCOM. The DoD should consider developing a procurement program that does not rely on a "peactime" DoD cargo or passenger buy.

10 The current CRAF procurement process leads to a transfer of government funds from the carrier that operate during peactime to carriers that do not want to operate. This arrangment is not "fair" for all participants, and may ultimately lead to a breakdown of the CRAF program. DoD should design a procurement program that does not rely on comissions.

9 The DoD procurment function should take steps to reduce the near total reliance on two large teaming arrangements.

4 DoD should maintain a data base of foreign owned and operated carriers that meet DoD's safety and quality standards

5 DoD should re-examine the use of civil carriers for aeromedical evacuation purposes

				Effectiveness						Feasibility					
Alternative	**Overall Rating**	Effectiveness	Feasibility	E1	E2	E3	E4	E5	E6	F1	F2	F3	F4	F5	F6
6	**8.5**	**3.0**	**2.8**	3	3	3	3	3	3	3	3	3	2	2	2
8	**8.0**	**3.0**	**2.7**	3	3	3	3	3	3	3	3	3	2	2	2
7	**7.6**	**2.8**	**2.7**	2	3	3	3	3	3	3	3	3	2	2	2
3	**7.5**	**3.0**	**2.5**	3	3	3	3	3	3	3	3	3	2	2	2
2	**7.1**	**2.8**	**2.5**	3	2	3	3	3	3	3	2	3	3	3	3
1	**7.1**	**2.8**	**2.5**	3	2	3	3	3	3	3	3	3	2	2	2
11	**6.7**	**2.5**	**2.7**	3	2	2	2	3	3	3	3	3	3	3	3
10	**6.3**	**2.5**	**2.5**	3	2	2	3	3	2	3	3	3	2	2	2
9	**6.2**	**2.3**	**2.7**	2	2	2	3	3	2	3	3	3	2	2	2
4	**5.8**	**2.7**	**2.2**	2	3	3	3	3	2	1	3	3	2	2	2
5	**5.0**	**3.0**	**1.7**	3	3	3	3	3	3	2	1	2	2	2	2

IV. CRAF INCENTIVES

The fundamental role of the CRAF program is to ensure DoD access to civil air transportation during peace and war. The current level of industry participation and the performance of the industry during the activation of CRAF during Desert Storm best demonstrate the success of the current CRAF program.

Our examination of CRAF has found the foundation of the program to be at risk from a steady increase in the capability to transport peacetime cargo on military aircraft, a weak linkage between DoD requirements and the allocation of peacetime business, and a financially unhealthy industry. The continuation of these situations without CRAF program adjustments could lead to a decline in CRAF participation below DoD requirements.

In order to better manage these risks, we believe the CRAF program could be restructured. The goal would be to: 1) eliminate the direct relationship between peacetime C-17 flight activity and CRAF participation; 2) lower DoD peacetime costs; and 3) assure continued DoD access to aircraft under US control. An additional success factor would be to simplify the current acquisition process by eliminating the complexities associated with the present "allocation" of business, the artificial nature of negotiated rates, and the costs associated with teaming arrangements.

The information on incentives in this section were prepared to assist the working group in developing and evaluating alternatives to achieve the goals stated in the previous paragraph.

A. ANALYSIS: ATTRIBUTING CRAF PARTICIPATION TO CURRENT INCENTIVES

Our review divides CRAF incentives into two categories:

1. Those within the AMC long-range international contract – which attempts to utilize CRAF mobilization value as a basis for market share distribution, or
2. Those outside the AMC long-range international contract – which do not attempt to utilize CRAF mobilization value as a basis for market share distribution.

Our review indicates that approximately 86 percent of all long-range international CRAF cargo participation, approximately 60 percent of all long-range international passenger CRAF participation, and 100 percent of all aero-medical CRAF participation should be attributed to the incentives within the AMC long-range international contract.

Any initiative to modify the CRAF participation incentives should recognize the significant positive impact of linking CRAF participation compensation with CRAF mobilization value.

B. BACKGROUND INFORMATION: FISCAL YEAR 2003 CRAF PARTICIPATION LEVELS

The FY03 long-range international cargo CRAF contains approximately 227 747-100F wide-body equivalent units. AMC's cargo CRAF participation target is 120 wide-body equivalent units. Thus, FY03 cargo CRAF participation is at approximately 189 percent of target.

The FY03 long-range international passenger CRAF contains approximately 276 747-100 wide-body equivalent units. AMC's participation target is 136 units. Thus, FY03 passenger participation is at approximately 203 percent of target.

The FY03 aero-medical evacuation CRAF contains 46 767 aircraft. AMC's participation target is 40. Thus the FY03 aero-medical participation is at approximately 115 percent of target.

C. BACKGROUND INFORMATION: SEVEN CATEGORIES OF CRAF-LINED PURCHASES

There are seven categories of US Government international air transport purchasing that function as long-range international CRAF participation incentives. Three of the seven are within the AMC long-range international CRAF contract. Four are not. The seven categories, the associated approximately annual Government purchases, and a few relevant characteristics are:

1. Eligibility to pursue AMC long-range international passenger charter contracts. Estimated total annual AMC purchase: $300 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 25 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: AMC attempts to distribute traffic based on CRAF mobilization value. Carrier team formation is permitted; contracts are awarded to teams.

2. Eligibility to pursue AMC long-range international cargo charter contracts. Estimated total annual AMC purchase: $182 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 15 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: AMC attempts to distribute traffic based on CRAF mobilization value. Carrier team formation is permitted; contracts are awarded to teams.

3. Eligibility to pursue AMC long-range international "Category A" cargo (palletized cargo, less than full planeload, pick-up at military depot, drop-off at military depot): Estimated total annual AMC purchase: $55 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF; cargo carriers 15 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: AMC attempts to distribute traffic based on CRAF mobilization value. Carrier team formation is permitted; contracts are awarded to teams.

4. Eligibility to pursue US General Services Administration (GSA) passenger transportation city pair contracts ("GSA city pair traffic"). This traffic consists of individually ticketed

personnel from DoD, from other Federal Government branches, and from cost-reimbursable government contractors traveling on domestic and international scheduled passenger service. GSA estimates these Government groups collectively purchase approximately $1.08 billion in annual city pair air transportation. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: City pair contracts are distributed based on price and service bidding; CRAF mobilization value is not considered when awarding contracts. It is estimated that approximately 50 percent of the $1.08 billion total market does not utilize contracted CRAF carriers, but instead elects to utilize domestic non-CRAF carriers or elects to utilize non-contract (matched or undercut) fares. Carrier team formation is not permitted; contracts are awarded to individual airlines.

5. Eligibility to pursue domestic military passenger charter contracts. Estimated total annual purchase: $62 million. Bidding eligibility: Passenger carriers 30 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: Charter flights are distributed based on price and service bidding; CRAF mobilization value is not considered when awarding contracts. Carrier team formation is not permitted; contracts are awarded to individual airlines.

6. Eligibility to pursue "Domestic Express" cargo contracts (domestic, small parcel, office to office shipment, utilized to move cargo for DoD, other Federal Government branches and cost reimbursable government contractors). Estimated total annual AMC purchase $98 million. Bidding eligibility: Cargo carriers 25 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: Traffic is distributed based on price and service bidding; CRAF mobilization value is not considered when awarding contracts. Carrier team formation is not permitted; contracts are awarded to individual integrated cargo companies.

7. Eligibility to pursue "Worldwide Express" cargo contracts (international, small parcel, office to office shipment, utilized to move cargo for DoD, other Federal Government branches and cost reimbursable government contractors). Estimated total annual AMC purchase $35 million. Bidding eligibility: Cargo carriers 25 percent of eligible fleet must be pledged to CRAF. Government market share distribution methodology: Traffic is distributed based on price and service bidding; CRAF mobilization value is not considered when awarding contracts. Carrier team formation is not permitted; contracts are awarded to individual integrated cargo companies.

D. BACKGROUND INFORMATION: FOUR TYPES OF CRAF CARRIERS

The effectiveness of seven current CRAF participation incentives is best evaluated from the perspective of the four primary CRAF carrier groups. These groups, their leading members, and their combined impact upon the FY03 CRAF are:

1) US major international scheduled passenger carriers: American Airlines, Continental Airlines, Delta Air Lines, Northwest Airlines, United Airlines, and US Airways. Combining to represent approximately 87 percent of the long-range international passenger CRAF and 100 percent of the CRAF aero-medical segment.
2) US "2nd Tier" international scheduled service and charter carriers: American Trans Air, Hawaiian Airlines, Omni International Airlines, and World Airways. Combining to represent approximately 13 percent of the long-range international passenger CRAF.
3) US international wide-body air cargo carriers: Atlas Air, Evergreen International, Gemini Air Cargo, Northwest Airlines Cargo, Omni International Airlines, Polar Air Cargo, Southern Air, and World Airways. Combining to represent approximately 51 percent of the long-range international cargo CRAF.
4) US international integrated cargo service air carriers: DHL, FedEx, Airborne Express, and UPS. Combining to represent approximately 45 percent of the long-range international cargo CRAF.

E. REVIEW OF CRAF INCENTIVE APPLICABILITY TABLE

As background for the quantification of the effectiveness of the seven CRAF participation incentives, please review the attached type-coded table (entitled "Applicability of CRAF Incentive for Various Carrier Groups).

This table denotes the applicability of the seven incentives for each of the four carrier groups and contains 28 type-coded boxes (4 carrier groups x 7 incentive categories).

The top half of the table reflects the three purchase categories within the AMC long-range international contract. The bottom half reflects the four purchase categories outside the AMC contract.

Italicized text notes those incentives that produce direct CRAF participation incentive.

<u>Underscored</u> text notes those incentives where CRAF participation is dependent upon AMC team formation and the payment of team commissions.

Bold face text notes those incentives that do not apply to a particular carrier group.

Please note only 8 of the 28 boxes are *italicized* – illustrating that very few of the Government's CRAF-linked purchasing programs function as directly applicable CRAF participation incentives.

Please note that of the 12 boxes reflecting the AMC contract, 3 are *italicized* (directly effective), 9 are underscored (indirectly effective because of AMC teaming), and none (0) is **bold face** (not applicable). This reflects the significance of AMC teaming and AMC extreme reliance upon indirect compensation (team formation and commissions).

Please note that of the 16 boxes reflecting the non-AMC contract purchases, only 5 reflect CRAF direct effectiveness (*italicized*) and 11 reflect purchases that fail to create any CRAF incentive for the particular carrier group (**bold face**). This reflects the incentive limitations associated with the current non-AMC purchasing methodology.

Please further note that each of the 5 directly effective non-AMC contract purchases is only effective up to a 25 percent or 30 percent ceiling – reflecting the critical absence of a mobilization value traffic allocation system. For example: the GSA city-pair contract creates a direct incentive for a major scheduled passenger carrier to pledge 30 percent of its long-range wide-body fleet to the CRAF. However, since GSA does not contemplate CRAF mobilization value when awarding contracts, the GSA city-pair purchase creates no incentive for a major scheduled passenger carrier to increase its CRAF participation above the 30 percent threshold. Thus, when reviewing the CRAF participation of a major scheduled passenger carrier, participation above the 30 percent threshold cannot be attributed to the GSA purchase.

F. A NOTE REGARDING THE AERO-MEDICAL CRAF

The four categories of CRAF-linked Government purchases that are outside the AMC contract create incentive for a scheduled carrier to participate in the passenger CRAF, but create no incentive for that carrier to undertake the extra burden of participation in the aero-medical CRAF.

A scheduled passenger carrier can qualify for GSA city-pair contract awards by pledging 30 percent of its long-range international fleet to the passenger CRAF.

The carrier is under no obligation and receives no benefit from GSA by choosing to pledge its aircraft to the aero-medical CRAF instead of the passenger CRAF.

The incentive for a carrier to choose the aero-medical CRAF over the passenger CRAF lies solely within the AMC contract. Under AMC's mobilization value assignment system, aircraft pledged to the aero-medical CRAF receive double mobilization value credit. Thus a carrier can receive more AMC traffic (or more AMC team commissions) from choosing the aero-medical CRAF over the regular passenger CRAF.

Thus, 100 percent of CRAF aero-medical participation should be attributed to the AMC contract incentives.

G. EFFECTIVENESS OF AMC CONTRACT PURCHASES VS. NON-AMC CONTRACT PURCHASES

As noted in the prior text, under the AMC contract, the Government seeks to distribute its peacetime purchases in approximate proportion to the mobilization value of a CRAF participant (or team). In seeking to distribute traffic based on CRAF mobilization value, the AMC contract establishes two critical factors that induce carriers to maximize their CRAF participation:

- **By increasing its CRAF participation, a carrier (or team) can increase its AMC contract revenue.**
- **By joining a CRAF team, a carrier can obtain indirect compensation (commissions) for traffic it is unwilling or unable to carry on its own aircraft.**

However, as previously noted, the non-AMC CRAF-linked purchases fail to create incentive for a carrier to pledge aircraft above the minimum eligibility threshold and fail to establish any method for indirect compensation. Thus, the non-AMC purchases attract fewer aircraft pledges.

Attached are two spreadsheets citing all the FY03 long-range international CRAF participants, listing their FY03 CRAF mobilization values, and attributing their participation to either the AMC contract incentives or the non-AMC contract incentives.

One spreadsheet is for the cargo CRAF and one for the passenger/aero-medical CRAF; both utilize the same methodology:

- **If a non-AMC contract incentive is applicable to a given carrier, that particular incentive is assumed effective up to the applicable CRAF participation threshold.**
- **If the given carrier's actual CRAF participation exceeds the non-AMC contract CRAF pledge threshold, then the carrier's extra CRAF participation is attributed to the AMC contract.**

For example, on the passenger side, the CRAF participation threshold applicable to non-AMC incentives (GSA and domestic military charters) is 30 percent. Therefore, a carrier such as Northwest must pledge a total of 30 percent of its long-range international fleet to the CRAF as a means of establishing its eligibility to bid for GSA city pair traffic and domestic military charters. Northwest actually pledges 93 percent of its long-range international passenger fleet to the CRAF; therefore, the first 30 percent is attributed to the non-AMC incentives and the remaining 63 percent is attributed to the AMC contract.

Please review the two spreadsheets.

- **The cargo CRAF analysis spreadsheet indicates that approximately 86 percent of the FY03 cargo CRAF should be attributed to the incentive system contained in the AMC long-range international contract.**
- **The passenger/aero-medical CRAF analysis spreadsheet indicates that**

approximately 60 percent of the FY03 passenger CRAF should be attributed to the AMC long-range international contract incentive system.

As previously noted, within the passenger arena all decisions to pledge to the aero-medical CRAF instead of the regular passenger CRAF are 100 percent attributed to the AMC contract incentive system.

Combining the passenger, aero-medical, and cargo CRAF segments, a total of 70 percent of the combined CRAF should be attributed to the incentives contained in the long-range international AMC contract (and the indirect compensation associated with its teaming and commission payment system).

Analysis of CRAF Cargo Incentives,
AMC Contract Accounts for 86 Percent of CRAF Cargo Pledges

Fiscal Year 2003, AMC Long Range International Cargo CRAF

CRAF Carrier	Carrier Business Focus	Long Range International Cargo MV	Assumed CRAF Participation Level	Attributed to Express Cargo	Attributed to AMC Contract	Attributed to Express Cargo	Attributed to AMC Contract
FedEx	integrator	1,048.52	100%	25%	75%	262	786
Northwest	pax and cargo airline	163.63	100%	0%	100%	0	164
Atlas	cargo airline	566.13	100%	0%	100%	0	566
Polar	cargo airline	199.36	100%	0%	100%	0	199
World	pax and cargo airline	58.90	100%	0%	100%	0	59
Gemini	cargo airline	174.84	100%	0%	100%	0	175
Evergreen	cargo airline	144.50	100%	0%	100%	0	145
UPS	integrator	111.76	25%	100%	0%	112	0
Omni	pax and cargo airline	26.19	100%	0%	100%	0	26
Air Transport Intl	cargo airline	63.80	100%	0%	100%	0	64
Southern Air	cargo airline	49.30	100%	0%	100%	0	49
Arrow	cargo airline	46.35	100%	0%	100%	0	46
DHL	cargo airline	35.87	100%	0%	100%	0	36
Airborne Express	integrator	16.54	100%	25%	75%	4	12
Totals		2,705.69			Totals	378	2328
					% of Total	14%	86%

CRAF Cargo Incentive Significance

Applicability of CRAF Incentives for Various Carrier Groups

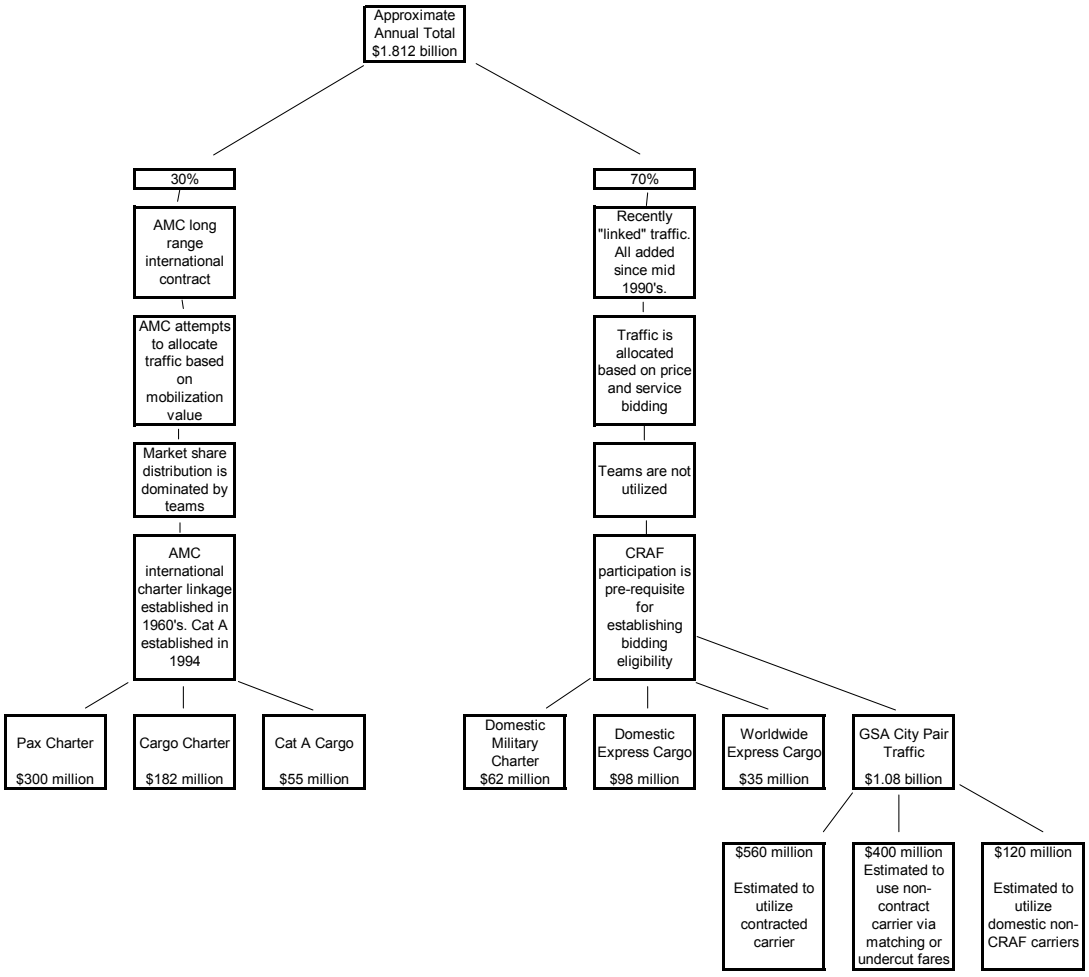
	Approximate Annual CRAF-Linked Purchase	US Major Scheduled Service Passenger Airlines	US Charter Passenger Airlines	US International Air Cargo Carriers	US International Integrated Cargo Service Air Carriers
AMC Contract: International Passenger Charters	**$300 million**	Directly Applicable, but traffic and pricing is deemed unattractive. Therefore major carriers seek AMC team formation and indirect compensation via team commissions	*Directly Applicable, but AMC market share distribution system necessitates formation of AMC teams and payment of teaming commissions*	Indirectly Applicable. Compensation is via AMC team formation and commissions	Indirectly Applicable. Compensation is via AMC team formation and commissions
AMC Contract: International Cargo Charters	**$182 million**	Indirectly Applicable. Compensation is via AMC team formation and commissions	Indirectly Applicable. Compensation is via AMC team formation and commissions	*Directly Applicable, but AMC market share distribution system necessitates formation of AMC teams and payment of teaming commissions*	Directly Applicable, but involves aircraft capacity issues and pricing issues. Therefore integrators seek AMC team formation and indirect compensation via team commissions
AMC Contract: International Category A Palletized Cargo	**$55 million**	Indirectly Applicable. Compensation is via AMC team formation and commissions	Indirectly Applicable. Compensation is via AMC team formation and commissions	Indirectly Applicable. Compensation is via AMC team formation and commissions	*Directly Applicable, but AMC market share distribution system necessitates formation of AMC teams and payment of teaming commissions*
Non AMC Contract: GSA City Pair Passenger Traffic	**$560 million**	*Directly Applicable up to 30% CRAF eligibility threshold*	**Not Applicable**	**Not Applicable**	**Not Applicable**
Non AMC Contract: Domestic Military Passenger Charters	**$62 million**	*Directly Applicable up to 30% CRAF eligibility threshold, but market is small and traffic is not highly desired by major scheduled carriers*	Directly Applicable up to 30% CRAF eligibility threshold	**Not Applicable**	**Not Applicable**
Non AMC Contract: Domestic Express Cargo Parcel Shipments	**$98 million**	**Not Applicable**	**Not Applicable**	**Not Applicable**	*Directly Applicable up to 25% CRAF eligibility threshold*
Non AMC Contract: Worldwide Express Cargo Parcel Shipments	**$35 million**	**Not Applicable**	**Not Applicable**	**Not Applicable**	*Directly Applicable up to 25% CRAF eligibility threshold, but market is small*

Bold Face type denotes non-applicable Incentives.

Italicized type denotes applicable Incentives.

Underscored type denotes Incentives that function indirectly.

Example of Distribution of Annual CRAF-Linked Revenue



Revenue estimates based on normal year expenditure estimates received from AMC and GSA. GSA domestic, non-contract, and contract breakdown is rough estimate.

Analysis of CRAF Passenger and Aero-medical Incentives,
AMC Contract Accounts for Approximately 60 Percent of Passenger Aircraft Pledges

Fiscal Year 2003, AMC Long Range International Passenger and Aeromed CRAF

CRAF Carrier United	Carrier Business Focus	CRAF Eligible Aircraft	CRAF Pledge	Long Range Int'l Pax anc Aeromed MV	CRAF Participation Level	Attributed non AMC Purchases	Attributed to AMC Contract	Attributed non AMC Purchases	Attributed to AMC Contract
Northwest	major scheduled service	159	96	824.96	60%	30%	30%	410	415
Delta	major scheduled service	59	55	560.08	93%	30%	63%	180	380
American	major scheduled service	146	72	709.40	49%	30%	19%	432	278
Continental	major scheduled service	155	100	633.11	65%	30%	35%	294	339
American Trans Air	major scheduled service	89	80	482.73	90%	30%	60%	161	322
USAirways	2nd tier sched service and charter	37	37	229.55	100%	0%	100%	0	230
World	major scheduled service	20	20	187.44	100%	30%	70%	56	131
Omni	charter	7	7	116.00	100%	0%	100%	0	116
Hawaiian	charter	5	5	47.45	100%	0%	100%	0	47
North American	2nd tier sched service and charter	12	4	34.32	33%	33%	0%	34	0
Totals	2nd tier sched service and charter	3	3	17.03	100%	0%	100%	0	17
		692	479	3,842.07			Totals	1567	2275
							% of Total	41%	59%

CRAF Incentive Significance, Passenger

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Appendix B

CHANGES IN THE AIRLINE INDUSTRY: EFFECTS OF NEW TECHNOLOGY, CHANGING INVESTMENT RULES, AND GOVERNMENT POLICY ON THE CRAF MISSION

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Anita Mosner

Eclat Consulting

A. INTRODUCTION

The airline industry is in the throes of a major financial and structural upheaval. The fundamental nature of this change makes it very difficult to project future trends from historical data. Established trends have been fractured within the last eighteen months, new developments crop up almost daily, and even the conventional wisdom about how the industry works is being called into question. Historical relationships do not seem to provide many answers.

Nevertheless, it is useful to understand the historical trends, if only as a basis for thinking about the magnitude of the problems facing the industry and what options the carriers may have in reengineering their networks to survive into the future. The basic approach of the early part of the paper is to chart summary data relating to the topic being discussed to show where the industry has been as well as recent changes. Later in the paper possible structural changes in the airlines' capabilities of interest to DoD going forward will be developed.

This appendix covers the following assigned topics:

1. An evaluation of the effect of expansion of the limits on foreign ownership of US carriers on:
    a. National capability for effective, rapid, and unilateral deployment of forces and materiel
    b. The long-term health of the airline industry.

2. An evaluation of the influence of the following on the future of the airline industry and its ability to meet DoD contingency requirements:
    a. Evolving technology
    b. Industry structure and practices
    c. Changes in fleet composition
    d. Alliances
    e. Protectionist and market-opening activities, and
    f. Legislative changes.

3. An assessment of current CRAF program assumptions that:
    a. Foreign controlled air carriers cannot be counted to meet their contractual commitments to deliver assets in response to a CRAF activation; and

b. The Fly America Act is essential to maintaining the primary incentive that DoD offers carriers in return to their commitment to CRAF.

For the purposes of exposition, these interrelated topics have been reorganized to present a logical grouping of related information as well as a progression from background history up to the latest developments in the industry.

B. A BRIEF HISTORY OF THE AIRLINE INDUSTRY

To provide a broad backdrop to the discussion it is useful to trace the major phases of the airline industry in the jet era—roughly since 1960.[41] The single most important event is the deregulation of the U.S. domestic industry in 1978. For 40 years the U.S. airlines had been subject to economic regulation of their domestic routes and rates. Since the Chicago Convention, international flying has been subject to bilateral agreements.

The most important parts of economic regulation—route and rate regulation—were eliminated after the passage of the Airline Deregulation Act of 1978 (the ADA).[42] Before 1978 the Civil Aeronautics Board (CAB) controlled entry and exit from markets based on a standard of public convenience and necessity. Each carrier had route certificate authority built up over a number of years showing the routes it could serve as well as many restrictions on those services. In practice, the CAB limited the entry of new carriers and new competitive service in all but the larger city-pair markets. Passenger fare and cargo rates were subject to public utility type regulation as well, which in later years set out rate structures and greatly limited any price discounting. After 1978, air carriers were free to enter or leave markets and charge fares as they saw fit.

Several new carriers (such as New York Air and People Express) entered the market in the first few years after domestic deregulation, but few were long-term successes. Although several airline startups were unsuccessful, new competitive pressures did force the majors to rethink their operating strategies. The most important change was the move to hub and spoke networks by the larger airlines. In the mid-1980s there were a number of mergers and acquisitions as carriers sought to increase the scope of their networks. There were also some major carrier failures as the industry sorted out the winners and losers under free market conditions.

While the changes in industry structure in the first decade of deregulation described in the paragraph above constituted a very difficult adjustment process, the overall assessment of domestic deregulation was very positive, and the idea of liberalizing airline regulation through the privatization of government owned carriers and the liberalization of rate and route regulation was being adopted in many countries in Europe and elsewhere in the world. So, too, was the hub and spoke concept of organizing carrier networks.

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[41] Any number of books and articles can provide a useful history. See for example: National Research Council (U.S.) Transportation Research Board. Wings of Change: Domestic Air Transport Since Deregulation, 1991.

[42] There remained a certification requirement and an Essential Air Service program designed to prevent the complete elimination of service at the country's smallest cities receiving certificated air service. The full complement of safety regulation under the Federal Aviation Administration (FAA) remained.

The next major phase occurred in the 1990s—the linking of networks in different countries through code sharing alliances and global marketing alliances. The model for effective international alliances was the Northwest / KLM alliance, which was approved in early 1993. As part of this alliance the carriers sought and received immunity from the U.S. antitrust laws (ATI).[43] In exchange for ATI, the government of the Netherlands entered into an open skies bilateral treaty with the United States, which eliminated the typical restrictions on service between the two countries. After DOT conferred ATI on Northwest and KLM, the U.S.G. on several occasions offered the prospect of conferring ATI on airline alliances as an incentive for other countries to agree to open skies with the United States. Eventually open skies bilateral treaties became popular in their own right in smaller countries and there are some 56 such treaties today according to DOT.

Two other important trends were occurring in the 1980s and 1990s. Code sharing—a practice in which one carrier places its two-letter carrier code on the flight of another carrier—became hugely popular. This occurred in two separate arenas—between small feeder carriers and major domestic carriers and between large international carriers. In the former arrangement, the smaller carrier acted as a "franchisee" of the larger carrier, and enabled larger carriers to "serve" smaller points as part of their hub and spoke networks. Today, some feeder carriers are owned by their major partners, and some remain independent. Under the latter type of arrangement between U.S. and foreign airlines, carriers shared each other's codes to gain "access" or hold out online service to points in each other's networks.

The second major trend was the successful rise of low cost service (sometimes called low fare service, point-to-point service or no frills service) as an alternative model to the hub and spoke model that had come to dominate the industry in the 1980s. The most prominent low cost carrier (LCC) originally and to this day is Southwest Airlines. But a number of other successful LCCs have grown up in recent years. Today LCCs account for as much as 28 percent of the domestic seats according to one recent estimate, and their competitive impact on fares extends to well beyond 50 percent of the U.S. domestic traffic. A recent Booz Allen study says the LCCs compete in at least 70 percent of the U.S. market.[44]

C. CHANGES IN INDUSTRY STRUCTURE

With this brief background it is useful to view the overall impact on the profitability of the industry in the jet age (see Figure 1 below). Under regulation there were virtually no profits, but no periods of major losses either. The deregulated industry has had periods of significant profits and significant losses, but is much more profitable on a cumulative basis. The industry is currently in a period of unprecedented losses that are predicted by Wall Street analysts to be even larger in 2002 than in 2001.[45] Airline profits are clearly impacted by recessions (tan bars in Figure 1), but the current slump in aviation goes well beyond any modern experience.

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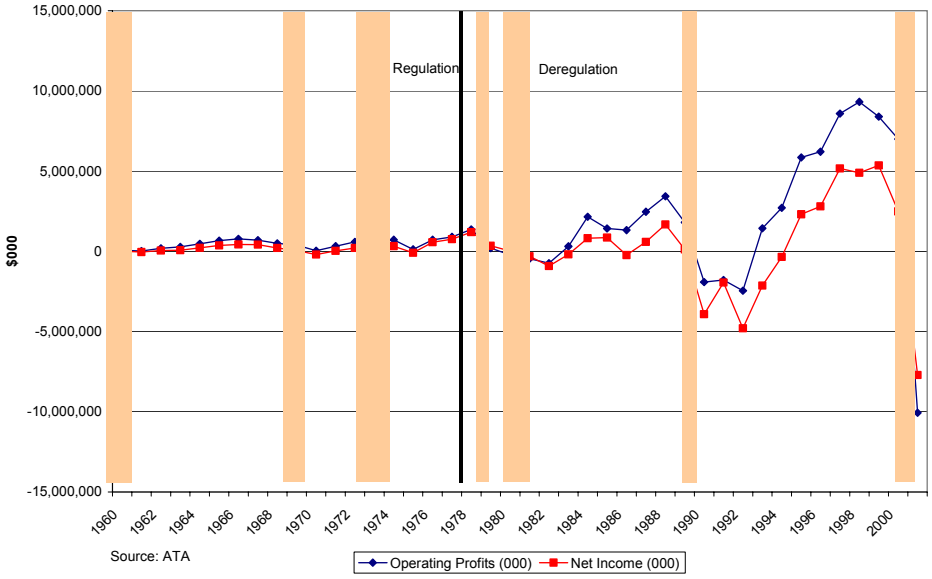
[43] Antitrust authority over aviation had resided in the CAB, and move to DOT in 1985 when the CAB was sunset. Authority over the domestic industry moved to DOJ but international antitrust authority remained with DOT because it was agency that retained (along with DOS) authority to negotiate bilateral aviation treaties.

[44] Airline hub-and-spoke system queried. By Caroline Daniel in Chicago. September 23, 2002.

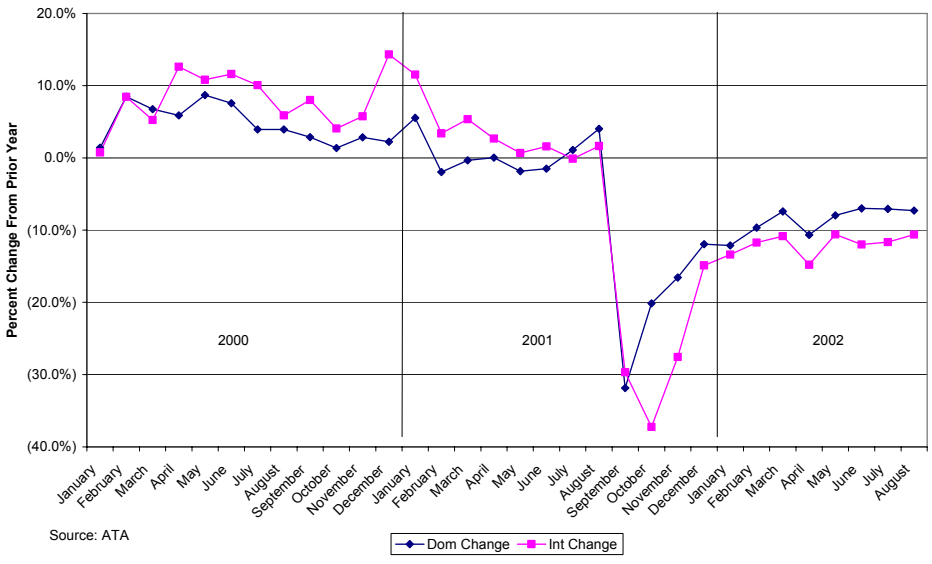
[45] Associated Press, Airline Stocks Trade Sharply Lower, September 13, 2002.

Figure 1. U.S. Airline Industry Earnings Since 1960



The operating profits and net income figures cover the total operations of the U.S. airline industry. The decline in demand is being experienced in both U.S. domestic and international operations. As Figure 2 shows, traffic declines started in early 2001 in the domestic market and dropped precipitously domestically and internationally as a result of the events of September 11, 2001. But, both the domestic and international traffic has remained 8-10 percent below 2001's pre-9/11 levels.

Figure 2. Neither Domestic Nor International Traffic Show Signs of Recovery
(Revenue Passenger Miles)

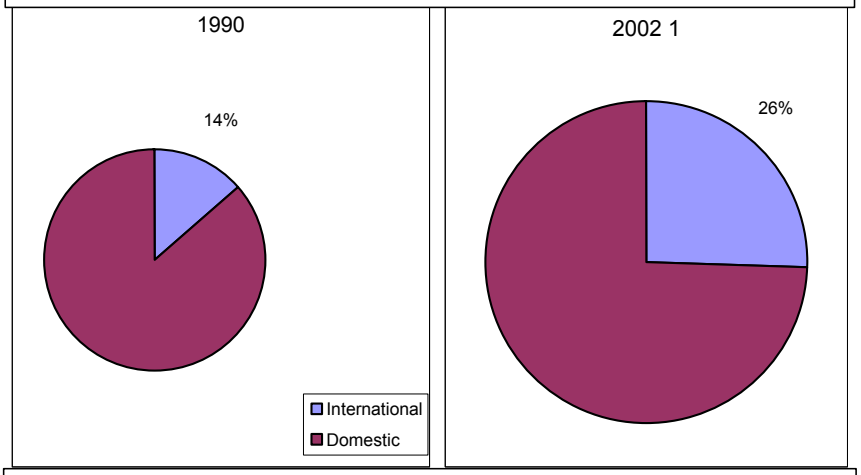


Looking back over the past decade, international traffic has grown considerably as a share of total U.S. carrier traffic due to the liberalization of bilateral treaties and the growth of code share and marketing alliances.

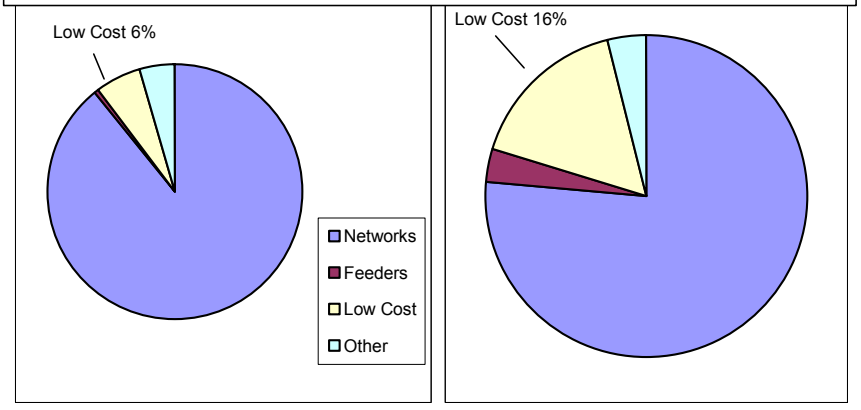
As shown in Figure 3 below, international traffic now accounts for one quarter of U.S. carrier traffic compared to just 14 percent in 1990. Nevertheless, the domestic market accounts for majority of U.S. carrier operations and current problems. While international traffic is down somewhat more for U.S. carriers than domestic traffic, the Air Transport Association (ATA) reports that average fares are starting to recover, and were down by just 0.2 percent in August 2002, while domestic fares remain 9.4 below last year's August levels.[46]

At this point we begin to focus on the domestic market where the large U.S. carriers that form the majority of CRAF wartime commitment are facing their greatest challenges.

Figure 3. International Traffic (RPMs) Has Become a Much Larger Part of U.S. Airline Operations Since 1990



Domestically, Low Cost Carriers Have grown to the point that they are dictating fares for the majority of passenger traffic



[46] ATA web site: http//www.airlines.org.

The lower two pie charts of Figure 3 break out the mix of traffic in the U.S. between four groups. First, the hub and spoke network carriers composed of America West, American, Delta, Continental, Northwest, United, and U.S. Airways; second their feeder, smaller aircraft operators, the Low Cost Carriers (LCC) which include Southwest, jetBlue, Frontier, Air Tran, Spirit, and American Trans Air, and other carriers, namely, Alaska, Aloha, Hawaiian, Horizon and Midwest Express. For the purposes of this paper it is important to note small aircraft feeder carriers are commanding a much larger share of the domestic pie and most critically, the LCC group has reached a size that cannot be ignored—to say the least.

In addition to the drop in overall demand being experienced by the major airlines, the low cost group has mounted a major challenge to the once nearly invincible major network carriers. The following series of charts will focus on the two rival groups—the network carriers and the LCC group.

Figure 4. Even the Disastrous 1990-1994 Period Does not Compare to the Current Crisis
Major Network Airlines Domestic Operations

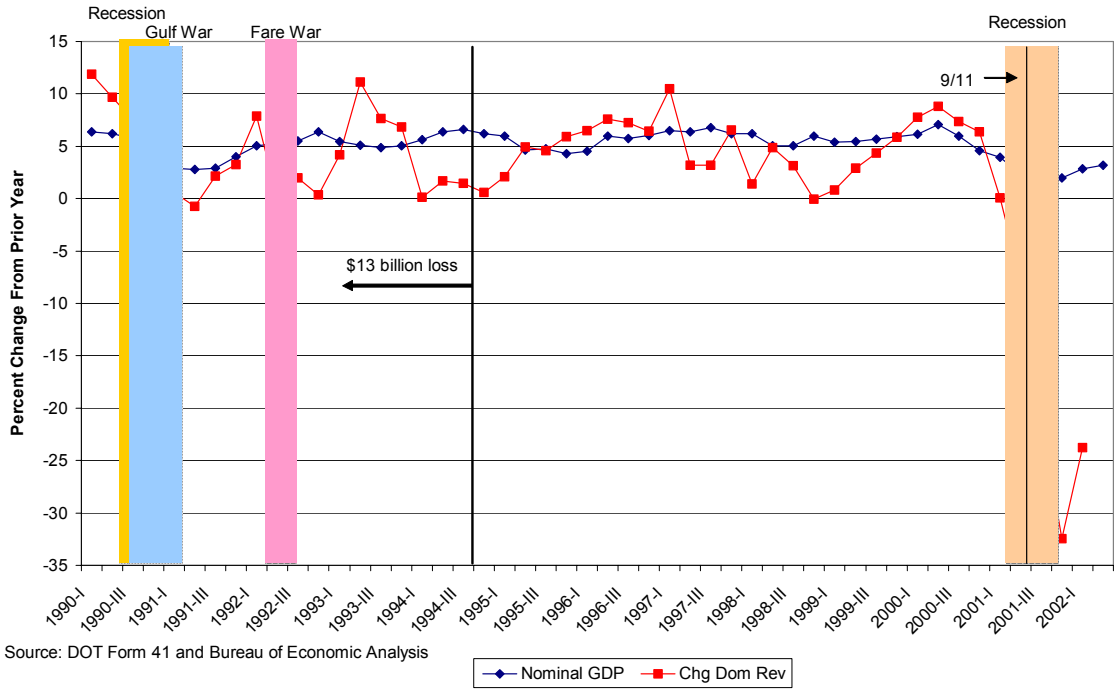
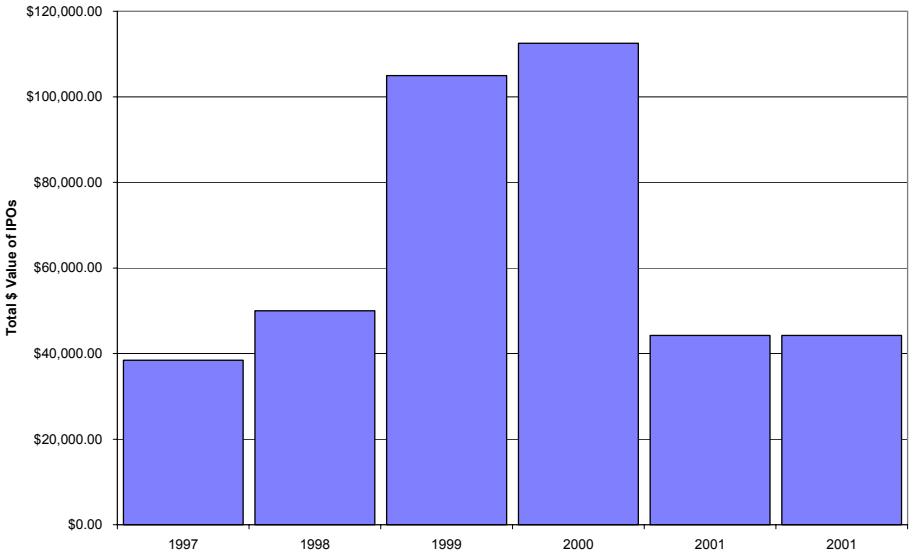


Figure 4 traces year-over-year quarterly changes in nominal GDP along with the change in passenger revenue of the major network carriers. Previously, the worst losses in U.S. airline industry history occurred in the 1990 to 1994 period. Within that period there occurred a recession, the Gulf War, and a disastrous cut-throat fare war in the summer of 1992. Yet, during that four years passenger revenue for the network carriers went down over the prior year quarter only once. In comparison, network carrier domestic revenue was still down almost 25 percent in the first quarter of 2001, is likely still hovering at double digit declines.

A large part of the explanation of the airline industry's fall off in domestic industry demand

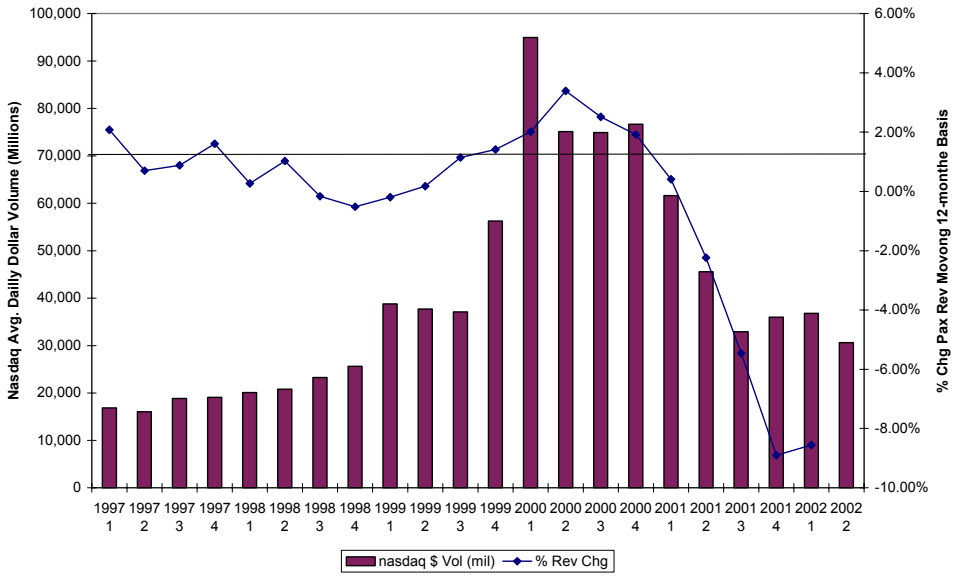
can be traced to the collapse of the "bubble economy" or "Dot-com bubble" after 2000. The business demand for air travel in this period was unsustainably strong both in terms of numbers of business passengers wanting to fly and the amount they were willing to pay to fly. Two charts below try to capture the underlying economic exuberance that existed and then virtually disappeared.

Figure 5. The Dot-Com Bubble Can be Seen in Ipo Activity



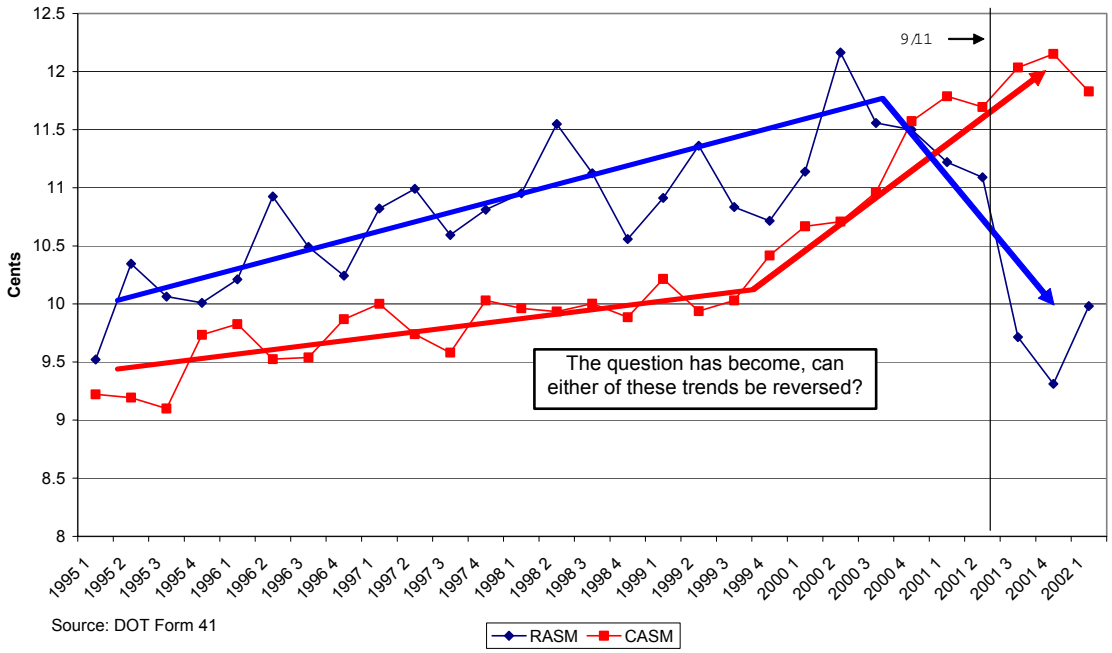
The next figure maps the change in airline revenues against the NASDAQ activity over a similar period.

Figure 6. The Dot-Com Bubble Didn't Influence Air Travel Demand Until !999 and Was Fully Played Out By the Second Quarter of 2001



Perhaps the most important point to be taken from the above is that the Dot-com bubble was very much a one-time aberration that increased the strength of commercial aviation demand but is unlikely to be repeated in the foreseeable future.

Figure 7. A Solid Growth in Domestic Unit Revenues For the Network Carriers in the Late 1990's Was Reversed in 2000 While Unit Costs Growth Accelerated



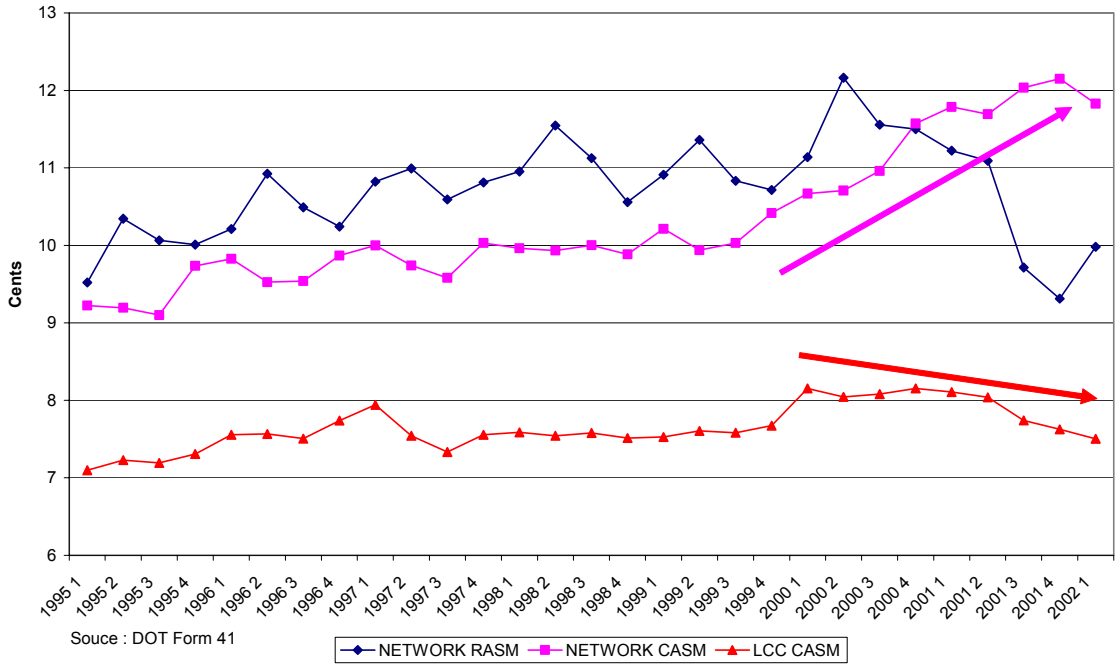
Source: DOT Form 41

An even more dramatic picture of the radically changed fortunes of the domestic network carriers can be seen in the trends in operating revenue per available seat mile (RASM) and operating cost per available seat mile (CASM). These two measures capture most of the relevant variables that affect profit—fare levels, demand, costs, load factors, etc. Figure 7 traces RASM and CASM for the domestic network carriers starting with the long period of airline prosperity in 1995.

This analysis shows clearly that the problem is not just a decline in revenue. Unit revenue growth turned down in the third quarter of 2000. This is a reflection of the much reported softness of business demand—business passengers are no longer willing to pay very high fares for highly flexible and frequent air service which is a prime feature that hub and spoke networks are designed to provide.

But that is only part of the dilemma the network airlines are facing. Unit costs started to increase in the third quarter of 1999 somewhat before revenues began their decline. The network carriers were headed for a sharp decline in profits well before September 11, 2001. The events of 9/11 have simply made the problem that much worse.

Figure 8. To Add to the Network Carrier's Domestic Problems, Low Cost Carriers Have Kept Their Costs Under Control



An even more fundamental challenge facing the network airlines in their domestic operations is accumulation of market share and price leadership now being exhibited by the low cost carriers. The low cost carrier market share has been measured in the 20 percent range recently and their market penetration has accelerated since 9/11 as network airlines have cut back service and low-cost carriers have filled in behind. On September 19, 2002, Fred Reid, President of Delta Air Lines said, "he expects low-cost carriers like Southwest Airlines to double their market share to 40 percent in the not too distant future"47 Since network carriers generally match low fares particularly for restricted or discount airfares so as to remain competitive, low cost carriers set fares for the majority of domestic passenger traffic. Figure 8 overlays CASM for the LCCs on Figure 7.

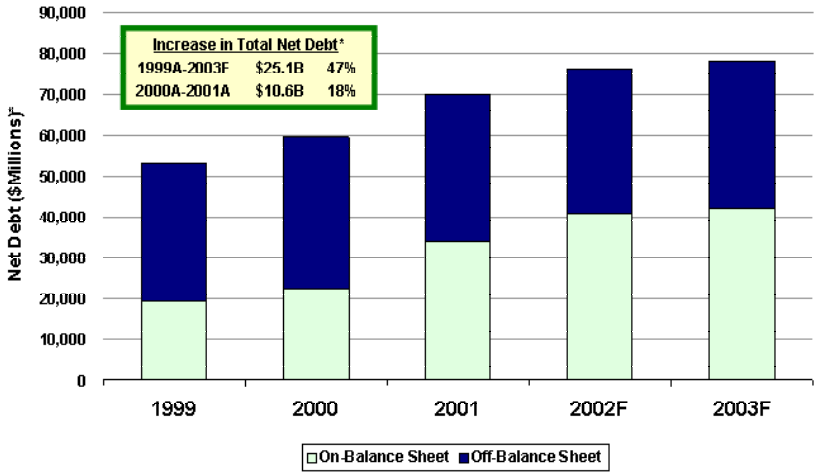
The LCC group is keeping its costs under control and widening the efficiency gap with network carriers as highly efficient carriers like jetBlue are growing at double-digit rates.

The losses that the major airlines are experiencing will impact their profitability well into the future; they are financing these losses with debt (see Figure 9).

[47] Consolidation is Wave of Future for Airline Industry, Delta President Predicts, Knight Ridder/Tribune Business News, September 19, 2002.

Figure 9. Airlines Have Taken on Massive Debt to Survive

Up Nearly 50% Over Four Years



Source: ATA * LTD + STD + Capitalized Operating Leases – Cash and Short-Term Equivalents as of December 31
Source: Salomon Smith Barney estimates for AirTran, Alaska, Americas, America West, ATA, Continental, Delta, Northwest, Southwest, United, US Airways

The weakened balance sheets have in turn impacted their credit ratings, which makes it that much more expensive to borrow, if indeed they can borrow at all. Among the major passenger airlines, only Southwest has a top credit rating and all other majors have seen their credit ratings slip from 1 to 8 levels (Figure 10). On the all-cargo side of the industry, United Parcel Service has the top rating of AAA.

Figure 10. Balance Sheets are Poor and Deteriorating

The Average Carrier is 90% Leveraged*

CORPORATE (ISSUER) CREDIT RATINGS

	9/10/01	9/10/02	Change
Alaska	BB+	BB	(1)
American	BBB-	BB-	(3)
America West	B+	B-	(2)
ATA	B+	B-	(2)
Continental	BB	B+	(2)
Delta	BBB-	BB	(2)
Northwest	BB	BB-	(1)
Southwest	A	A	-
United	BB+	CCC	(7)
US Airways	B	D	(8)

Note: > BBB- = investment grade; < BBB- = junk status

Source: ATA * (LTD + Capital Leases + Capitalized Operating Leases - Cash)/(Total Capital) as of March 31, 2002
Sources: Deutsche Bank Securities; Standard & Poors

D. CARGO TRENDS

Figure 11 shows that total cargo traffic has been impacted by the general recession, which began in the first quarter of 2001, but was not additionally affected by the events of 9/11 as passenger traffic has been. International air cargo makes up over 80 percent of total U.S. carrier air cargo.

Figure 11. Cargo and Mail Traffic Has Been Depressed By the Current Recession, But was not Greatly Affected by 9/11

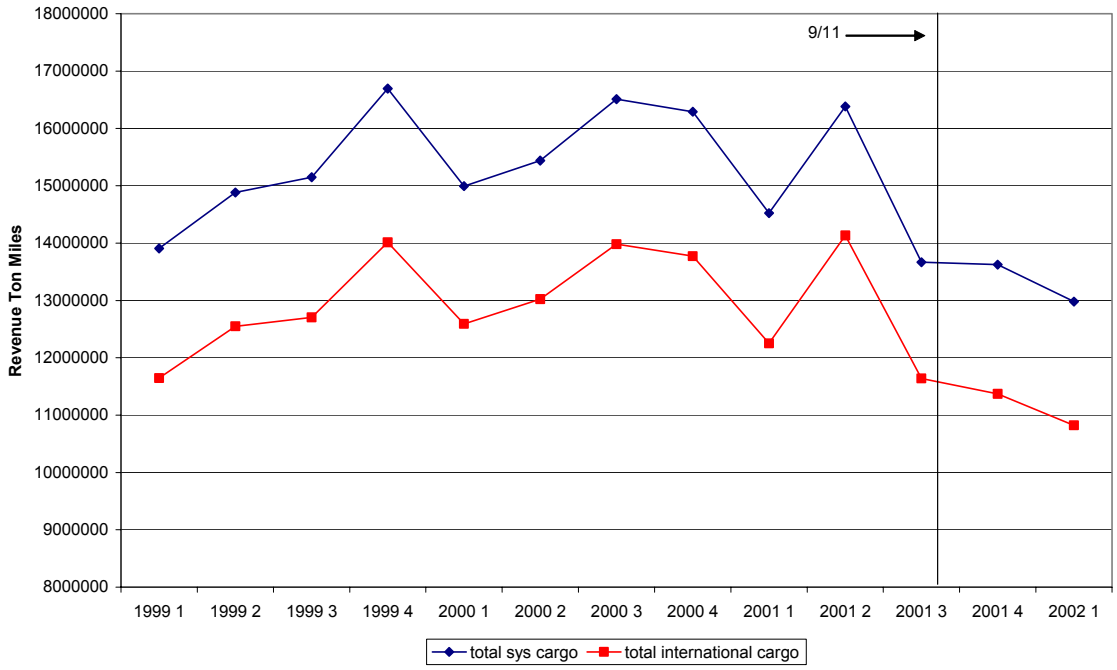
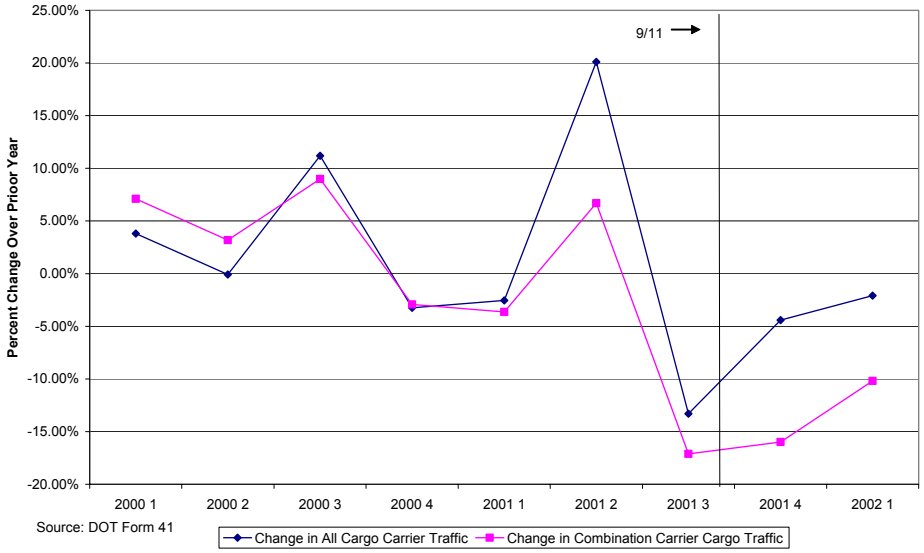


Figure 12 shows that all cargo carriers are recovering much faster than the freight and mail carried in the bellies of the passenger carriers. Security measures after 9/11 have shifted freight and mail away from passenger carriers, and this is one other challenge to the financial recovery of the major network carriers.

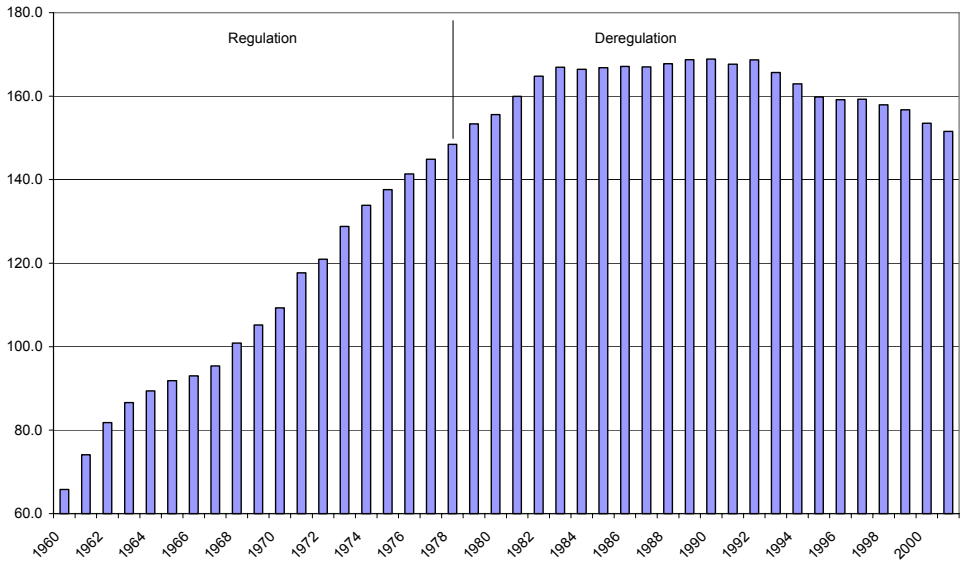
Figure 12. The Traffic for All Cargo Carriers is Recovering Much Better Than the Belly Cargo for the Combination Carriers



E. INDUSTRY STRUCTURE AND TECHNOLOGICAL CHANGE

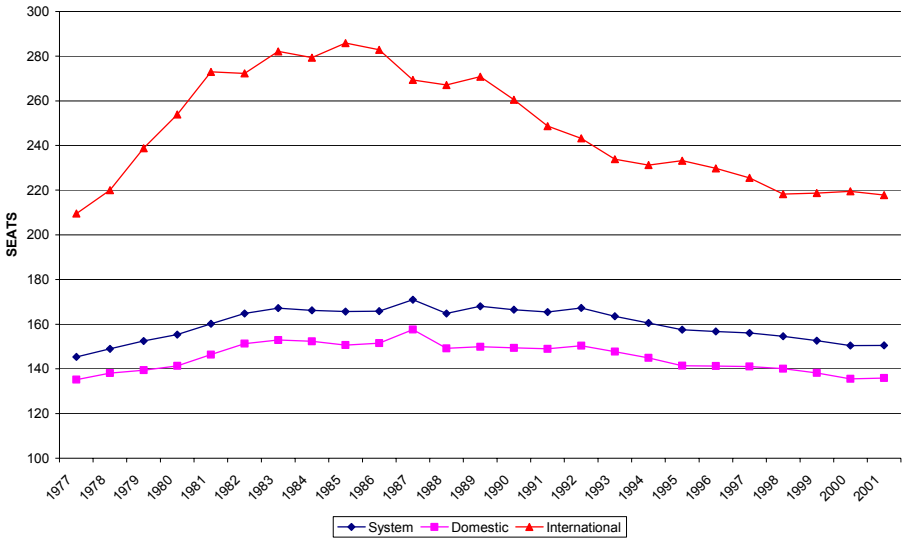
Technology has continuously increased the size and range of aircraft since the first commercial flight, so average aircraft size has increased virtually from the beginning of modern aviation. Figure 13 covers 1960 forward. Under economic regulation competition was suppressed and the mechanics of regulation rewarded carriers with newer and larger aircraft. After deregulation the airlines responded to market demand for frequency, which was inconsistent with a continual increase in aircraft size.

Figure 13. U.S. Certificated Passenger Carriers Average Seats



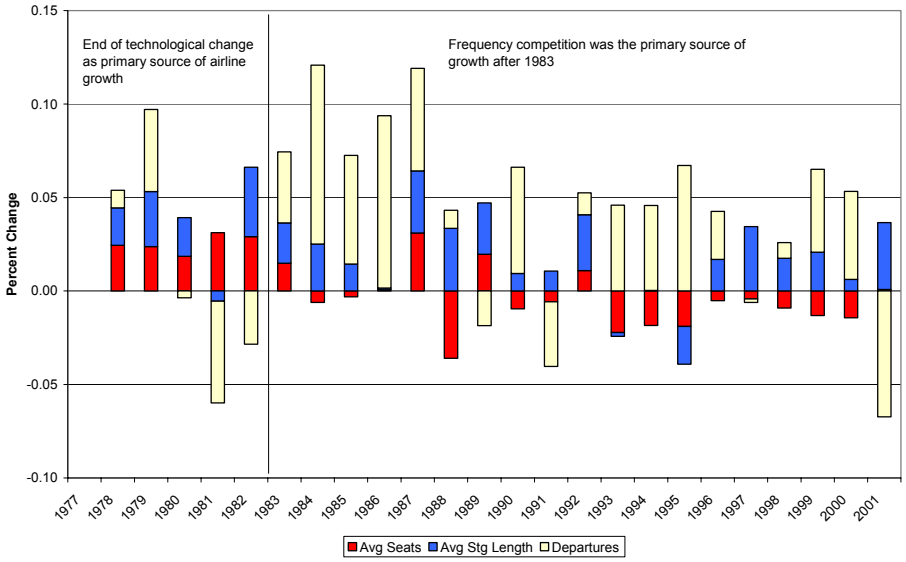
Average aircraft size leveled off in the mid 1980s and started to decline in the 1990s. This was true in both domestic and international markets as shown in Figure 14.

Figure 14. U.S. Certificated Passenger Carriers
Average Seats, Domestic and International



While the airline industry continued to grow, it no longer relied on technological change to meet that growth. Figure 15 shows the source of capacity growth divided among changes in aircraft size and increases in stage length and increases in the number of departures. (Available seat miles, the standard measure of industry capacity, is the product of average aircraft size, stage length and departures.) The sum of the percentage changes in these three elements is a close approximation of total capacity growth.

Figure 15. Sources of Change in Capacity



F. STRUCTURAL CHANGE IS COMING (OR, MORE CORRECTLY, IS ALREADY HERE)

All of the largest players in CRAF International Long-Range Passenger Lift—the main CRAF component in time of war—are the major U.S. network carriers. While it is not at all clear what is going to happen to the international portion of the network carrier operations as a group, the domestic operations, which make up 75 percent of the group's operations, will almost certainly change dramatically and is likely to dictate the corporate future of the seven major networks. A consensus is rapidly forming that the networks as we know them today cannot survive without major changes.[48] The explanations and remedies vary, but there is no disagreement on the prognosis—major structural change is coming.

Why significant structural change has come. The current problems facing the U.S. network airline carriers dwarf anything the airlines have ever faced. Including the $5 billion paid by the U.S. government for proximate losses following the 9/11, the U.S. airlines will have lost $20.7 billion in just two years—2001 and 2002.[49] The previous worst period in history was 1990-1994, when a recession, the Gulf War, and a major fare war followed in rapid succession (see Figure 4). In that 4-year period the U.S. carriers lost $13 billion. While the size of the current losses will contribute to the industry's problems going forward because their balance sheets have been decimated and, for those carriers that survive, will have to be repaired over time, it is a number of fundamental changes, some recent and some that have been building for some time, that have come into focus and will likely prevent the networks as a group from rebuilding to profitability, thereby leading to major structural change.

Hub and Spoke Networks—An Achilles' Heel Revealed? The hub and spoke system was the "great innovation" brought about by U.S. airline deregulation in 1978. It became the basic business model in the U.S. and around the world. It is without a doubt the best way to interconnect hundreds of cities and tens of thousands of city pairs to take advantage of economies of scope. In spite of these positive attributes, it cost a great deal of money to run a network and it appears to be inefficient compared to point-to-point service carriers that specialize in serving medium to large cities. The hub and spoke systems have been built and expanded to serve the business passenger market—the group that needs frequent air service, often on short notice, to many destinations, large and small, and is (or was at one time) willing to pay top dollar for such network service. Of course, leisure travelers could take advantage of the network's unsold seat inventory at lower prices and thus contribute to the payment of the cost of the system. Major airlines developed fare structures to segment the business passenger from the discount passengers through the use of restrictions (the highest fares had none, and lower fares had Saturday night stay, advance purchase, and non-refundability requirements to name a few). Sophisticated computerized yield management systems were developed to insure that the optimum revenue was obtained on each flight. Hub and spoke systems were built to provide frequent, nearly ubiquitous service, and prices were set to maximize revenues in conjunction with yield management. Cost minimization was not central to the business model since its primary objective was to provide service to satisfy the needs and desires of the

[48] Within a few weeks in September three major consulting firms have reached the conclusion that fundamental changes in networks are inevitable: Booz Allen, McKinsey and Company, and The Mercer Group.

[49] The ATA recently announced that it estimates 2002 losses at $8 billion; 2001 losses were $7.7 billion not counting the $5 billion government payment.

businessperson. Customer loyalty programs such as frequent flyer rewards and free access to luxury lounges where businesspersons could rest or conduct business at many larger airports were an integral part of the business model.

Point-to-point carriers like Southwest and jetBlue, on the other hand, use cost minimization as the central feature in their business model and then price to cover cost and profit. They have grown by adding markets that are large enough to support frequency from mostly newly generated passengers. Originally, low cost, low fare carriers were aimed at expanding the market at the low end—the short haul, discretionary passengers who were traveling by surface or not traveling at all. That model, while still focusing on keeping costs low, has now expanded to longer distance markets and even coast-to-coast service and is attracting an ever-increasing share of the customer base of the network airlines.

When the "dot-com" bubble burst and a general recession took hold in the first quarter of 2001, (and for other structural reasons elaborated on below) business travelers became less willing to pay the high prices necessary to cover the high costs of the network business model. Thus a fatal flaw in the network system as it had been developed may have been exposed—it requires a very robust business environment in order to make a profit. But, if the downturn in the general business economy and the post-9/11 security costs and service "hassles" were the only cause of the network carriers' problems, there would be reason to believe that some cost cutting and an eventual general economic recovery would allow the network carriers to return to their former profitability. Unfortunately, there appears to have been a number of structural changes that have taken place along side of the general drop in the business demand for air travel that account for the majority of the network carrier problems.

Structural Changes v. Cyclic Changes. While some of the current drop in business demand is short term and cyclic, there are a series of changes that appear to be more or less permanent alterations to the way the domestic airline industry works. Table 1 lists a breakdown of the two categories gleaned from published reports.

Low Fare Carrier Penetration Analyzed. The largest structural change that has occurred is the growth of the low fare carrier segment of the industry. An analysis of the Origin and Destination Survey data collected by the Department of Transportation for the first quarter of 2000 (the last normal first quarter pre-9/11) and the first quarter of 2002 (the latest available post-9/11 quarter) provides a revealing picture of how the domestic airline industry structure has changed from a "normal past period" to the post-9/11 period.

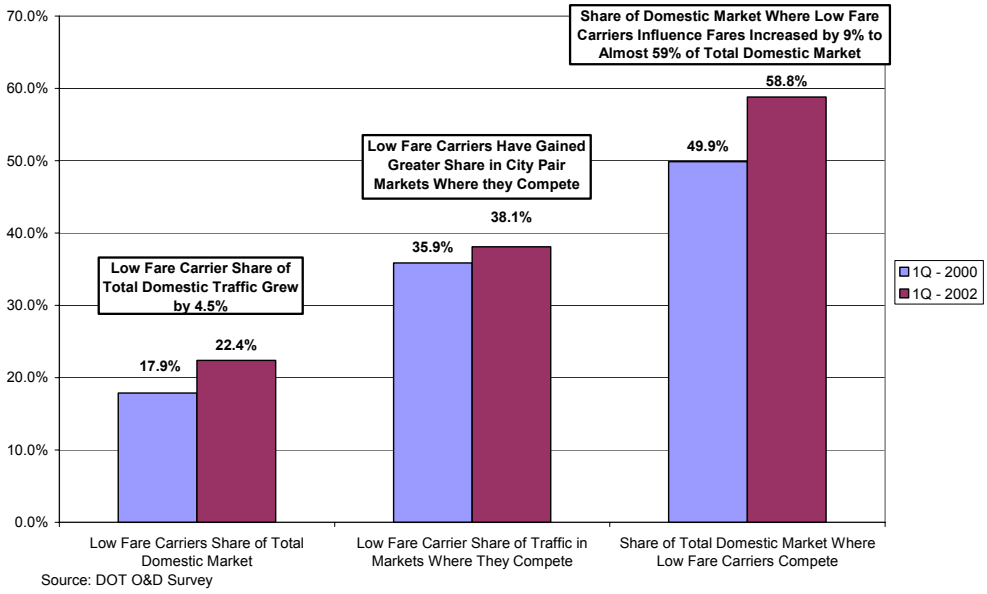
Table 1. Causes of Current Slump in Air Service Passenger Demand Cyclic and Structural			
Item	**Cyclic (Short Term)**	**Structural**	**Comment**
Current Recession	X		Historically linked to GDP which is not down dramatically. Probably a small part of the current problem.
Post 9/11 Hassle Factor	X		Clearly a big factor below 500 mile trips – low-fare carrier traffic growth above 500 miles suggests may not be a big problem in the aggregate. [50]
Security Fees	X	X	A problem that impacts price of air travel – depresses traffic for all carriers – some relief may come from Congress but may be a lasting issue in the post-9/11 world.
Low-fare Carrier Penetration		X	Key structural change that will only get worse for the network carriers. Availability of low fares is shifting demand.
Disappearance of Bubble Economy		X	Likely to be permanent. May still be being rung out – telecommunications infrastructure overbuilt.
Internet Marketing of Airline Seats		X	Has made fare offers transparent to business and leisure travelers. Genie may be out of the bottle for good.
Other Changes in Business Traveler Price Elasticity	X	X	Company policies have shifted to save money on travel budgets. Could be somewhat reversed in good times. Teleconferencing may have come of age – may not be reversible.

The share of domestic passenger traffic for low fare carriers has been growing steadily for a number of years. But, suddenly it has jumped by 4.5 percentage points in just the last two years to 22.4 percent (Figure 16). In other words, 22.4 percent of domestic passenger trips were on low fare carriers. However, the impact of low fare carriers is much greater than that. In the first quarter of 2002, in markets where the network carriers and other non-low fare carriers had to compete with low fare carriers, average fares were about 19 percent lower than where they didn't have to compete. Low fare carrier fares were 46 percent lower than in markets where there was no low fare competition. Moreover, low fare carriers disciplined fares in markets that account for 58.8 percent of domestic traffic.[51]

[50] In the first quarter of 2000, 28.5 percent of passenger trips and 18.9 percent of domestic revenue came from markets of less than 500 miles.

[51] Low fare carriers were considered to be in an airport pair market if the had at least one passenger per day each way.

Figure 16. Structural Change in the U.S. Domestic Market Toward Low Fare Carriers
1st Quarter 2000 v. 1st Quarter 2002

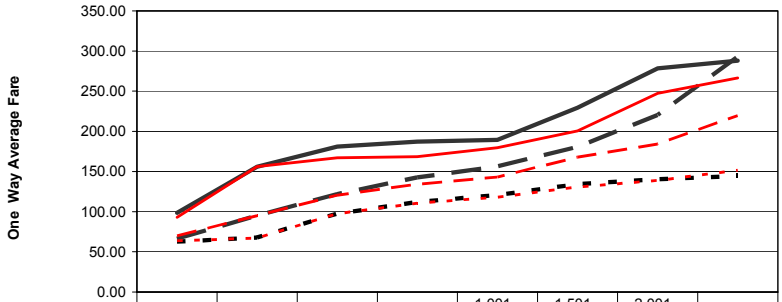


Source: DOT O&D Survey

Their domestic penetration had increased by 8.9 percentage points in just two years.

The analysis further divided the domestic data by journey stage lengths and between low fare carriers and non-low fare carriers. By the first quarter of 2002, less than half the domestic revenue of full service carriers came from markets without low fare competition. And even there average fares were down by 5.3 percent reflecting the decreased business demand. Long haul fares in these markets were down much more than short haul fares. Where network carriers had to compete with low fare service, their average fares were down by 7.8 percent—again down much more in the long haul markets than in the short haul. Average fares for the low fare carriers held steady over all distances (Figure 17).

Figure 17. While Low Fare Carriers' Fares Remained About the Same, Fares for Other Carriers Were Pulled Down Substantially in Markets Above 500 Miles
1st Quarter 2000 v. 1st Quarter 2002



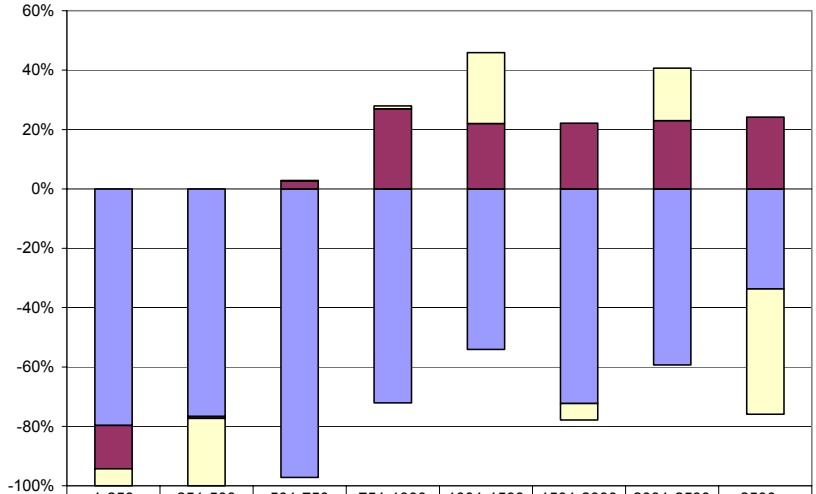
	1 - 250	251 - 500	501 - 750	751 - 1,000	1,001 - 1,500	1,501 - 2,000	2,001 - 2,500	2,500 +
2000 W/O Low Fare Service	98.62	155.86	180.92	187.23	189.42	229.46	278.55	287.98
2000 Low Fare Markets Low Fare Carriers Only	62.72	67.75	97.51	111.98	120.83	134.17	140.39	144.47
2000 Low Fare Markets Non Low Fare Carriers	66.21	95.07	121.92	142.73	156.40	180.44	220.36	292.95
2002 W/O Low Fare Service	92.99	156.17	166.95	168.47	179.56	200.57	247.37	266.52
2002 Low Fare Markets Low Fare Carriers Only	63.71	67.02	97.47	110.44	118.07	130.65	138.93	151.53
2002 Low Fare Markets Non Low Fare Carriers	69.88	94.94	120.56	134.24	143.21	167.96	184.30	219.45

Source: DOT O&D Survey

But it is not so much the reduced fares that have impacted the network carriers as much as the drop in passenger traffic and the structural shift of traffic to low fare carriers. Below 500 miles all carrier groups lost traffic because of the drop in business travel due in part to the hassle factor from delays at the airport due to increased security measures. But there has been a marked shift to low fare service especially for trips above 750 miles. (Figure 18)

When the fare declines, traffic declines, and traffic shifts to low fare carriers are considered together, the devastating impact on primarily network carrier revenues is evident. (Figure 19) In the first quarter of 2002, there was an approximate $6 billion loss of passenger revenue mostly at the network carriers, relative to the first quarter of 2000.

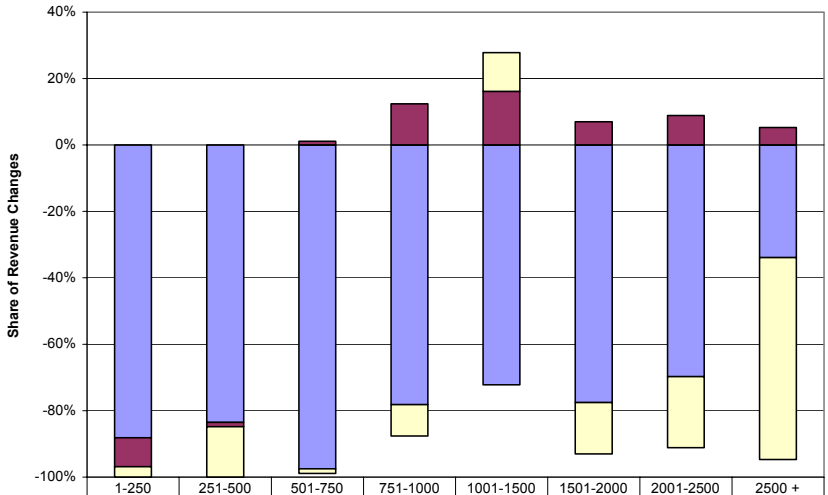
Figure 18. The Structural Change Toward Low Fare Carriers Can Be Seen Most Clearly in the Composition of Passenger Changes By Mileage Blocks
1st Quarter 2000 v. 1st Quarter 2002



	1-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2500 +
Low Fare Markets Non Low Fare Carriers	-322,020	-1,606,280	6,360	43,120	2,980,820	-120,940	403,160	-234,960
Low Fare Markets Low Fare Carriers Only	-818,380	-48,580	103,540	1,205,900	2,740,800	475,940	522,080	134,520
Markets With No Low Fare Service	-4,481,720	-5,437,520	-3,769,080	-3,220,780	-6,740,600	-1,555,360	-1,348,500	-187,800

Source: DOT O&D Survey

Figure 19. The Shift to Low Fare Carriers Has Been Devastating to the Network Carriers' Revenue
(Millions of Dollars)
1st Quarter 2000 v. 1st Quarter 2002



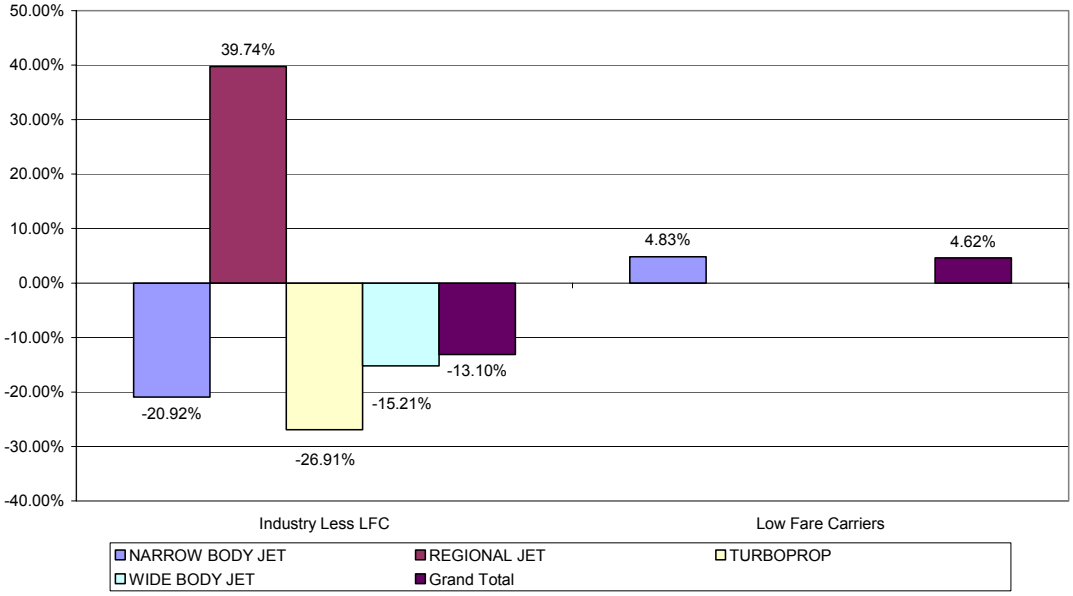
	1-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2500 +
Low Fare Markets Non Low Fare Carriers	-$17	-$154	-$12	-$96	$225	-$122	-$171	-$260
Low Fare Markets Low Fare Carriers Only	-$48	-$13	$10	$126	$311	$55	$71	$23
Without Low Fare Service	-$487	-$844	-$844	-$794	-$1,394	-$609	-$559	-$145

Source: DOT O&D Survey

The structural shift of traffic and revenue away from the long haul domestic markets makes the continued operation of the current long-range narrow-bodied and wide-bodied fleet problematic. This structural shift has troubling implications for the CRAF fleet. Already we have seen announcements of the grounding or retirement of wide-bodied aircraft operating mostly on international routes (11 747-400s, 18 MD11s and 14 767-200s) that will apparently be replaced by existing aircraft operating domestically. Those aircraft will in turn be replaced in domestic service by smaller narrow-bodied aircraft that are in turn being replaced by regional jets. This process has already been taking place to a significant degree as shown by the following analysis.

Figure 20 below analyzes the change in scheduled departures by broad aircraft category—wide-body jets, narrow-body jets, regional jets, and turboprops) in nonstop service from U.S. cities to other U.S. cities or to foreign destinations52. The summarized data are divided between non-low cost carriers and low cost carriers. The September 2001 schedule in place on 9/11 is compared to the current Official Airline Guide offerings for November 2002 (both are 30-day months).

Figure 20. The Network Carriers Are Reducing Their Use of Wide Body and Narrow Body Jets and Turboprops, And Filling in With Regional Jet Operations
Departures, September 2001 v. November 2002



The changes are dramatic. Narrow-body jets, which made up 58 percent of all (891,038) scheduled U.S. operations in September 2001, will have decreased by 21 percent in November 2002 according to current schedule listings. Wide-body operations, which represented only 4 percent of U.S. carrier operations last September, will have decreased by 15 percent. Turboprop operations will be down by 27 percent. Both narrow-body and turboprop operations are being replaced by regional jets which have increased by 40 percent since 9/11. While total operations are down substantially, regional jet operations are replacing narrow body jet operations in important city-pair markets and turboprop operations at feed markets from smaller communities. The regional jet is

[52] Adjusted to include foreign inbound flights since intra-U.S. departures in effect counted both directions.

popular with business travelers and is being used to keep adequate frequency in business markets, and to replace turboprops that are slowly being phased out of service by the major carriers.

The low fare carriers today operate narrow body aircraft and have increased their scheduled operations by 4.8 percent.53 They have filled in service behind some markets abandoned by the network carriers (mostly non business discretionary travel markets) and low fare carriers have also added new long-haul service.

While this process has been going on since 9/11/01, enormous operating losses are continuing at our largest network carriers, and it is very likely that a large number of larger aircraft will be grounded or otherwise disposed of to curb operating losses and restructure in a way that will allow networks to remain going concerns in the face of ever growing low fare capacity and competition. Moreover, except for low fare carriers, orders for new aircraft from the largest network carriers have dried up and many existing orders are being deferred until 2006 at the earliest in order to reduce capital outlays in the next three years.

The concern is that the largest network carriers have not yet developed a strategy to deal with their short term situation other than grounding larger aircraft, laying off employees, and perhaps through bankruptcy or the threat of bankruptcy, cutting unit labor costs; and there is no apparent strategy to deal with the long term structural changes that have taken place as yet. Since annual losses at the $7 to 8 billion annual level appear to be continuing, we can only assume that announcements of more large aircraft groundings will continue. The real shakeout has yet to come, and the long-term makeup of the U.S. fleet will continue to be an open question. The evidence so far suggests that the active fleet will have fewer large aircraft suitable for CRAF use and the fleet that remains will be needed by the airlines more than in the past to keep as much revenue flowing as possible to generate cash to cover ongoing losses and capital expenses.

The full extent of the restructuring of the U.S. airline industry is not yet apparent. But, it seems likely that larger aircraft will continue to be eliminated from the fleet until a business model emerges that can use such aircraft profitably in the long run. The current dominant business model—the hub and spoke network—does not seem robust enough to continue unchanged in the face of the present structural and cyclic challenges. And even if the hub and spoke model does survive, it seems likely that the network carriers will be smaller, less financially vigorous, and fly smaller equipment. And there may be fewer networks at the end of a shakeout.

[53] American Trans Air (ATA) operated a small amount of scheduled service with wide-body L-1011's in September 2001, but no longer does so. ATA also is affiliated with a feeder carrier at its Chicago Midway hub.

G. ALLIANCES AND CRAF

The major U.S. carriers have traditionally had an advantage over foreign competition because of the tremendous amount of traffic U.S. carriers can generate in the domestic U.S. market. (Historically the U.S. market has represented about 40 percent of the world aviation market.) However, U.S. carriers have been largely unable to sustain their services beyond major foreign gateways to secondary international points. To improve access to each other's markets, various U.S. and foreign air carriers have established marketing relationships with each other.

There are currently four major marketing alliance groups. There are various degrees of integration among members within each marketing alliance. Typically membership involves code sharing in some designated markets, and in some cases frequent flyer reciprocity is involved, and in a few cases two or more members within an alliance have antitrust immunity, which allows them to jointly discuss and set fares and service levels.

The four groups are: (1) the Star Alliance with 17 members headed in the U.S. by United, (2) the Oneworld Alliance with 15 members headed in the U.S. by American, (3) the SkyTeam Alliance with 13 member airlines headed in the U.S. by Delta, and (4) the Northwest/KLM alliance, which includes Continental. The members are listed in Table 2 below.

Table 2
Major International Alliance Members

Star	One World	Sky Team	Northwest/KLM
Air	Aer Lingus	Alitalia	KLM
Air New Zealand	American	AeroMexico	Northwest
ANA	TWA	Air France	Continental
Asiana	British Airways	Delta	
Austrian	Cathay Pacific	Korean	
British Midland	Finnair	Czech	
LOT	Iberia		
Lauda	LanChile		
Lufthansa	Qantas		
SAS	Swiss		
Singapore Airlines	JAL		
Thai Airways	Japan Air System		
Tyrolean	SN Brussels Airlines		
United	TAM Brazil		
Varig	Grupo Taca		
Mexicana			
Spanair			

The relative size of these international marketing alliances is indicated by some selected statistics set out in Table 3 below.

Table 3 Alliance Group Statistics										
				Worldwide Scheduled August 1-7, 2002				IATA International Data 2001		
Alliance Name	U.S. Anchor Carrier	Number in Alliance		Departures	Seats	ASMs		Passengers	RPKs (000)	ASKs (000)
Star	United		United	24,463	2,706,447	3,512,813,901		11,253,694	75,918,762	105,914,387
		17	Total	76,500	9,650,107	11,425,570,686		131,461,227	428,980,507	599,734,753
oneworld	American		American	32,556	3,394,155	3,793,887,786		16,310,626	58,784,743	83,779,723
		15	Total	77,360	10,100,913	11,899,043,283		109,141,960	395,750,225	561,999,010
SkyTeam	Delta		Delta	30,869	3,296,182	2,936,389,335		7,187,664	39,704,142	55,560,006
		6	Total	53,055	6,103,173	6,166,959,438		56,441,754	199,172,323	273,173,533
Northwest/KLM	Northwest		Northwest	18,976	1,985,460	2,105,436,122		9,698,554	52,604,275	67,472,026
		3	Total	38,823	3,917,061	4,739,719,136		34,841,120	145,540,277	192,980,386

Since these marketing alliances increase the scope of the U.S. carrier's marketing reach, they add to the revenue generating potential of the U.S. members and contribute to the cash flow of our major carriers.

U.S. carrier access to traffic varies by world region and depends on each U.S. carrier's own international services and alliance partners' size and location. (Table 4) Moreover, the current health of aviation markets differs significantly by world region. For example, IATA reports passenger traffic in Europe year-to-date through August 2002 is down 11.1 percent compared to an 8.6 percent decline for North America, while Asia Pacific traffic appears to be much healthier, up 0.1 percent.54

As part of the process of DOT review of alliance code sharing arrangements, applicants are required to indicate whether the arrangements will have any impact on CRAF obligations of U.S. carriers. The answer is invariably there is no impact on CRAF.

The current turmoil in the U.S. industry could destabilize some of these alliance arrangements, or lead to some switching of members from one alliance to another.

[54] IATA web site.

Table 4 Aliance Service By World Region					
World Region	Data	Star	oneworld	SkyTeam	Northwest/KLM
Total	Departures	76,500	74,274	53,055	38,823
	Seats	9,650,107	9,401,217	6,103,173	3,917,061
	ASMs	11,425,570,686	11,571,688,195	6,166,959,438	4,739,719,136
Africa/ME	Departures	273	838	371	134
	Seats	58,488	154,099	71,185	26,925
	ASMs	125,983,603	309,134,541	178,798,138	89,020,863
Asia	Departures	9,464	3,846	2,658	454
	Seats	2,432,037	1,307,061	641,397	144,959
	ASMs	3,032,296,867	2,139,463,550	697,887,809	481,557,896
Canada	Departures	8,949	463	350	599
	Seats	756,705	62,050	29,596	58,465
	ASMs	862,883,733	144,476,122	64,882,566	69,986,397
Central America	Departures	2,436	1,850	3,781	850
	Seats	300,976	241,150	353,389	79,915
	ASMs	235,400,410	267,145,288	324,894,864	120,200,299
Europe	Departures	23,206	23,672	15,053	3,270
	Seats	2,591,421	2,687,824	1,662,675	372,218
	ASMs	2,572,212,103	2,926,984,481	1,708,252,576	746,800,932
Oceania	Departures	3,551	6,366	40	53
	Seats	316,720	810,731	13,555	10,261
	ASMs	466,892,466	956,731,805	48,640,604	8,083,628
South America	Departures	2,565	6,093	149	127
	Seats	381,322	804,925	34,084	27,126
	ASMs	426,852,377	642,765,311	145,337,495	71,589,705
USA	Departures	26,014	31,114	30,575	33,325
	Seats	2,808,392	3,330,673	3,290,848	3,195,492
	ASMs	3,699,038,834	4,184,531,401	2,997,173,084	3,151,128,876
Other	Departures	42	32	78	11
	Seats	4,046	2,704	6,444	1,700
	ASMs	4,010,293	455,696	1,092,302	1,350,540

H. INTERNATIONAL BILATERAL ISSUES AND CRAF

There are 97 countries that have bilateral air service treaties with the United States. Since 1993 the U.S. has negotiated 56 "open skies" agreements with its trading partners. Although a few large markets are not "open skies" (notably the United Kingdom, Brazil, China and Japan), open skies markets account for vast amount of world traffic. The basic open skies elements are:

- Open entry on all routes
- Unrestricted capacity and frequency on all routes
- Unrestricted route and traffic rights, including no restrictions as to intermediate and beyond points, changes of gauge, routing flexibility, and the

right to carry Fifth Freedom traffic (behind the country of origin or beyond the destination country)

- Double-disapproval pricing
- Liberal charter arrangement (the least restrictive charter regulations of the two governments would apply, regardless of the origin of the flight)
- Liberal cargo regime (criteria as comprehensive as those for the combination carriers)
- Conversion and remittance arrangement (carriers would be able to convert earnings and remit in hard currency promptly and without restriction
- Open code sharing opportunities
- Self-handling provisions (right of a carrier to perform/control its airport functions going to support its operations

Also since 1993, more than two dozen bilateral treaties have been liberalized to allow more access to traffic. Several have provided open skies for cargo. While the lack of open skies presents some policy problems such as the need to allocate traffic rights to certain carriers and not others, and higher fares, they cannot be characterized as "protectionist problem areas" that would impact the CRAF program in any significant way. In fact, although certain carriers might lament limits on their access to various markets, the fact is that artificial bilateral restrictions on market access tend to produce higher yields for the carriers that serve them. Greater access would provide incrementally more traffic, but would not likely make the difference between surviving and not surviving the current domestic crisis.

For the most part, gaining access to U.S. Government-financed traffic has not figured prominently in U.S. bilateral air service negotiations (more on this issue below). However, the European Union has indicated a desire to address a wide array of issues with the United States, including "Fly America." Great Britain has made an issue over access to Fly America traffic in negotiations over open skies, but other more intractable issues such as slot limitations at London, and limits on Fifth Freedom flying are by far the larger obstacles to market liberalization.

The next major step toward liberalization is multilateral aviation treaties. The U.S. is a signatory to the Multilateral Agreement on the Liberalization of Air Transport Services, which also has been signed by Brunei, Chile, New Zealand, Singapore and Peru. So one framework at least has been established. With the recent decision of the European Court of Justice declaring illegal several of the provisions of the "Open Skies" agreements between the United States and several EU Member States, the European Commission may in the not-to-distant future secure the mandate it needs to negotiate a multilateral agreement with the United States. Although the form the EU initiative may take is very much open, it is worthwhile to examine a proposal advanced by the Association of European Airlines (AEA) in a 1995 policy paper, which was later expanded in 1999. European authorities are evaluating and refining this proposal. It is called the Transatlantic Common Aviation Area ("TCAA"). TCAA goes beyond full pricing and operating flexibility of the open skies model and identifies four core areas for liberalization:

- The freedom to provide services between any points in the Area, including two points in a single country;
- Unrestricted airline ownership and the right of establishment;
- The harmonization of standards for the evaluation of airline competitive behavior; and
- The elimination of restrictions on the use of leased aircraft, and the reservation of the carriage of government-financed traffic to national carriers.

Under the TCAA, carriers may fly between any two points in the Area. This is the case even if that service does not include a point in the carrier's homeland (i.e., a Seventh Freedom service), or, indeed, is operated solely between two points in a foreign country (i.e., a "cabotage" service). Carriers would be free to price their services as they choose, subject only to normal competition laws. Services operated to a point outside the Area, or by a carrier from a nation outside the Area, would continue to be governed by traditional bilateral air service agreements.

The TCAA contemplates the elimination of all restrictions on ownership and control for carriers within the Area. For example, U.S. citizens may freely invest in a carrier operating and based in the United Kingdom, just as a British investor could do the same with regard to a carrier operating within the United States.

The TCAA would call for the harmonization of competition policies. Competition authorities of each state would be expected to share information with each other, and to discuss and perhaps coordinate their enforcement activities. The authorities should also seek to develop common understandings on critical concepts, such as market definitions, the definition of "market power," and the like. While this arrangement would not derogate from the jurisdiction of any one nation's competition body, the assumption would be that such jurisdiction would be exercised in concert with sister authorities within the TCAA.

Under TCAA, carriers would be free to lease aircraft to each other at will, subject only to relevant safety and security regulations. This is a change from the status quo, in which European carriers are prohibited from wet leasing their aircraft to U.S. carriers. All carriers operating within the Area would be able to carry the government-financed traffic of any party.

Although the Commission and the U.S. Government have expressed strong interest in the further liberalization of the U.S.-Europe air transport relationship, certain elements of the TCAA proposal already have elicited controversy. These elements are the proposed elimination of all restrictions on airline ownership, the authorization of so-called "cabotage" services, and the lifting of restrictions on "wet lease" services.

In the United States, concerns about the elimination of ownership restrictions have been raised on both legal and political grounds. From a legal perspective, current U.S. law requires that U.S. carriers be "citizens" of the United States, which for corporations means that no more than 25% of the company's voting shares may be held by non-U.S. citizens. Therefore, it is likely that Congress would have to amend the Federal Aviation Act before the United States could sign the TCAA. Potential problems, such as the emergence of flags of convenience or unsafe wet leases, can

be addressed by enforcing applicable safety rules. Moreover, the availability of sufficient civil airlift capacity for national security purposes can be guaranteed through the use of conditions and restrictions on a carrier's operating authority.

Perhaps the most controversial aspect of this proposal is that it contemplates the operation of "cabotage" services. The prospect of having non-U.S. airlines participate in the U.S. domestic market has raised concerns with U.S. airlines, which have heretofore enjoyed exclusive access to their home market, and with organized labor, which is concerned about the effect of this on airline employment. Still others are concerned about a perceived commercial imbalance of this proposal. The European view of commercial "balance" differs quite a bit from the prevailing view in the United States. The prevailing view in Europe is that U.S. carriers already enjoy "cabotage" rights, given their extremely broad rights to fly between countries within Europe (Fifth Freedom rights). In fact, the proliferation of airline alliances may have rendered the cabotage debate largely moot, given the fact that airlines almost always rely upon their alliance partners to penetrate local foreign markets. The airline industry financial current crisis in the U.S. has probably strengthened our carriers' opposition because the most likely new service would come from a low fare type carrier.

While a TCAA type regime might be something for the future, the first order of business for the U.S. airlines is to restructure their own operations back to a point where they can be profitable, which is likely to take several years at a minimum. Only then can the very tough issues raised by the TCAA proposal begin to be addressed.

I. CAN FOREIGN-CONTROLLED CARRIERS BE COUNTED ON TO MEET THEIR CRAF OBLIGATIONS?

We have been asked to examine whether foreign-owned carriers can be counted on to meet their CRAF obligations, and, more particularly, whether changes in current U.S. laws on the ownership of U.S. carriers might affect U.S. carriers' willingness/ability to meet their CRAF obligations.

With regard to foreign air carriers, the primary concern facing the Department of Defense is the fact that such carriers are subject to the sovereignty and regulatory authority of another government. On the one hand, foreign carriers have in the past flown missions for DoD, and it is entirely possible that such carriers would face no governmental obstacle if they were directed to respond to a CRAF activation.

On the other hand, there are limits on the ability of the U.S. Government to compel a foreign carrier to comply with such an order. Of course, the Department of Transportation might have the ability to revoke that carrier's U.S. operating authority. However, this penalty might not offer much leverage if the carrier's homeland government has issued an order prohibiting it from meeting its CRAF operations. (In such an event, that carrier might face even larger penalties and costs for defying the order of its own government.) Moreover, the fact that many foreign air carriers register their aircraft in their own country means that the United States would lack the ability to commandeer such aircraft in the event of a national emergency.

There might be ways in which the U.S. Government could secure for itself greater ability to compel a foreign carrier to meet its CRAF obligations, such as requiring that all aircraft to be flown for CRAF service be "N" registered. Moreover, the United States Government could attempt to seek advance assurances from the homeland governments of foreign CRAF carriers that such governments would not take steps to block their carriers from participating in the CRAF program.

The question of the U.S. Government's ability to get ironclad assurances from a foreign carrier participant in CRAF is of some concern. However, there is some evidence which indicates that there is enough U.S. lift available to meet at least the mid-term needs of CRAF. In our view, the economic crisis facing U.S. airlines triggers an even larger issue, which is whether the injection of foreign capital would affect a carrier's willingness/ability to participate in CRAF, which is discussed below.

1. Expansion of the Limits of Foreign Ownership and CRAF

We have been asked to discuss the possible effects any change in current foreign ownership law might have on the ability of the U.S. Government to induce carriers to participate in the CRAF program. Before delving into this analysis, we will describe the current restrictions on foreign ownership, and procedures the Department of Transportation uses to monitor compliance with the law. We will then discuss the possibility of a legislative change which would allow non-U.S. citizens to hold up to 49% of a carrier's voting stock, and, in closing, consider the issues posed if U.S. carriers were permitted to be wholly owned by non-U.S. interests.

a. Overview of U.S. Laws and Regulations

Under the Federal Transportation Code ("Code"), an air carrier is defined as "a citizen of the United States undertaking . . . to provide air transportation."[55] A "citizen of the United States" is defined thereunder as follows:[56]

> (A) an individual who is a citizen of the United States;
>
> (B) a partnership each of whose partners is an individual who is a citizen of the United States; or
>
> (C) a corporation or association organized under the laws of the United States or a State, the District of Columbia, or a territory or possession of the United States, of which the present and at least two-thirds of the board of directors and other managing officers are citizens of the United States, and in which at least 75 percent of the voting interest is owned or controlled by persons that are citizens of the United States.

Although the statute provides that a U.S. citizen is a corporation that is owned or controlled by citizens of the United States, DOT consistently has interpreted its statute to require that such a corporation be owned and controlled by U.S. citizens.[57]

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[55] 49 U.S.C § 40102 (a) (2).
[56] 49 U.S.C § 40102 (a) (15).

As part of its process of granting an air carrier its initial operating authority, DOT must satisfy itself that a carrier is a U.S. citizen. As part of the certification process, DOT requires not only an affidavit of citizenship, but also demands that the applicant state the nationality of all of its major owners, directors and officers. The applicant must also identify its primary sources of financing, and the nationality of its major financial backers. When there is a foreign investor involved in the transaction, DOT also inquires closely about any business, personal or professional ties between and among the various parties.

DOT's obligation to ensure the fitness of its carriers is of a continuing nature. DOT has put into place requirements that a carrier advise the Department if the carrier undergoes a major change in operation, if more than 10% of its voting stock changes hands, or if there is a major change in personnel at the company.[58]

DOT's fitness review process is conducted on an informal, non-docketed basis. However, there have been several cases in which DOT formally has found that a carrier that it previously had certified no longer qualified as a U.S. carrier because of changes to its ownership and management structure, with the carrier being subject to an impermissible degree of foreign control. For example, the Department issued a tentative finding that Wrangler Aviation no longer qualified as a U.S. citizen because foreign investors had an impermissible degree of control over the carrier.[59] The Department also revoked the economic authority it previously had granted to Discovery Airways, based on the finding that the carrier was subject to an impermissible degree of control by a group of Japanese investors.[60]

At present, DOT is being urged to institute a formal proceeding to determine whether or not DHL Airways still qualifies as a U.S. citizen under the Code. Although DHL meets the bare statutory citizenship criteria, DHL has a large number of commercial and financial ties to DHL International, which is wholly owned by Deutsche Post. Several of DHL's U.S. competitors (notably Federal Express and United Parcel Service) assert that Deutsche Post exerts at least de facto control over DHL Airways, and argue Deutsche Post should not be able to gain access to the U.S. domestic cargo market via DHL Airways, given those carriers' inability to access the German domestic market.[61] Moreover, the carriers say that Deutsche Post competes unfairly, and that it subsidizes its express cargo operations with the profits it earns as the exclusive carrier of Germany's domestic mail.

Control is very flexible concept, and has to be reviewed on a case-by-case basis. DOT has found impermissible foreign control where a foreign entity has the direct power to influence an air carrier's operations and decisions. The power to control also can be indirect, as where a foreign entity or individual, through his or her relationships, has the ability to exercise a substantial

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[57] See, e.g., In the Matter of the cancellation of the operating authority issued to Westates Airlines, Inc., DOT Order 94-12-17 (December 13, 1994).

[58] 14 CFR § 204.2(1), and 14 CFR § 204.5.

[59] In the Matter of the Cancellation of the operating authority issued to Wrangler Aviation, DOT Order 93-7-26 (July 15, 1993).

[60] See Application of Discovery Airways, Inc., DOT Order 90-7-17 (July 6, 1990).

[61] See, e.g., Petition of United Parcel Service, Docket OST-202-13089.

influence over the carrier, despite meeting the nominal criteria of the law.[62] Negative control by foreign entities also raises citizenship concerns, as, for example, where a foreign entity has the power to veto major carrier decisions or to liquidate a carrier.[63] Substantial equity holdings can raise foreign control concerns. As a general rule, DOT is more concerned about a foreign entity having a significant equity position in a carrier than it is about large debt interests.[64] For publicly traded companies, "control" might be wielded by a relatively small bloc of stock, if the remaining shares are widely held. Numbers do not tell the entire story.

b. Change of Existing Standard to 49% Voting Stock

The question that has been posed is whether a possible legislative change which would allow non-U.S. citizens to hold up to 49% of a U.S. carrier's voting stock would have any effect on that carrier's ability/inclination to participate in the CRAF program. The assumption that at least tacitly underlies this question is that the foreign investor (or its homeland government) might have misgivings/objections about such participation and that the investor might be in a position to either discourage and/or prohibit the U.S. carrier from so participating.

Opponents of altering this standard have indicated that even with a so-called "minority" stake in a U.S. carrier of 49%, foreign nationals may be in a position to exert considerable influence over the carrier. These investors, the theory goes, may affect a carrier's other commercial decisions, such as alliance selections and aircraft purchases, and, therefore, it is not much of a stretch that an influential director (or directors) might discourage a U.S. carrier from participating in CRAF for either policy or commercial reasons.[65]

This issue is highly complex, and it is far from clear that the "risk" raised by a foreign shareholder that holds 25% of a carrier's voting equity discouraging CRAF participation is significantly less material than the "risk" posed at the 49% voting equity threshold. Under either standard, DOT would presumably still be examining the carrier's ownership, management and financial arrangements to assure itself that the carrier remains under U.S. control.

A point that warrants discussion is the motivation behind a carrier's CRAF participation. At some level, there is an assumption that an entity that has some foreign ownership might be less inclined to participate in CRAF out of a sense of patriotism. Regardless of the truth of that assumption, a more central issue is the fact that U.S. carriers have indicated that they participate in CRAF not out of a sense of patriotism, but because it is in their commercial self-interest to do so. If that is the case, then a carrier's willingness to participate in CRAF should be relatively insensitive to the citizenship of its owners. If CRAF participation is financially attractive in its own right, the precise ownership structure of the carrier should be relatively immaterial.

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[62] See Trans Borinquen Air, Inc., DOT Order 2000-4-20 (April 19, 2000).
[63] See e.g., Page Avjet Corp., Order 83-7-5 at 3, 4.
[64] Application of Discovery Airways, Inc., Order 90-2-23 at 5.
[65] It is useful to note, however, that the U.S. Government uses foreign owned vessels as part of its military sealift program. An extensive review of the Voluntary Intermodal Sealift Agreement ("VISA") program might be in order to examine the possible pitfalls of foreign participation in the U.S. defense program.

If there were continued concern about the willingness of carriers with significant foreign ownership to participate in CRAF, a possibility that might be considered is that the United States in legislation might extend enhanced investment opportunities only to certain favored nations—i.e., nations with which the United States has particularly close security or political ties, or only those nations which have concluded liberalized aviation agreements with the United States. Such a measure would not be entirely unprecedented.[66]

There have been a few recent cases in which DOT has permitted non-U.S. investors to hold up to 49% of the total equity in a U.S. airline, so long as the statutory limits on the holding of voting stock were adhered to. For example, when Northwest was in financial jeopardy in the early 1990s, DOT permitted KLM to hold up to 49% of Northwest's total equity, based in part on the fact that such equity holding did not confer upon KLM the ability to exercise control over Northwest, and in part on the strength of the liberal nature of the Netherlands–U.S. bilateral air service relationship.[67]

There have been other circumstances in which DOT has chosen to interpret its ownership and control standards in a liberal manner. In the overwhelming majority of these cases, DOT noted either strong public interest reasons for doing so, or the cases involved investors from nations that have liberal bilateral air service relationships with the United States.

DOT has made explicit its willingness to at least entertain changes in air carrier foreign ownership rules if such changes would bring about new opportunities for U.S. airlines. In the 1995 Statement of U.S. International Air Service Policy, 60 Fed. Reg. 21841 (May 3, 1995), DOT indicated that it would be prepared to seek "changes in U.S. airline foreign investment law . . . to enable us to obtain our trading partners' agreement to liberal arrangements . . . ." This Statement makes it clear that DOT views the opportunity of a foreign entity to invest in a U.S. carrier as an important aeropolitical tool.

While DOT's earlier policy statement refers primarily to using enhanced investment as a means of securing additional air service opportunities for U.S. interests, it might be possible for either Congress or the Department of Transportation to adopt a standard that makes enhanced investment opportunities not only upon the availability of reciprocal opportunities for U.S. interests, but also upon the foreign investor's making a firm commitment that its investment will not affect the U.S. carrier's participation in CRAF.[68]

DOT has sought such "CRAF" commitments in other contexts. For example, under the current DOT review of carrier requests for immunity under the antitrust laws, DOT requires carriers to state whether their alliance will have an effect upon the U.S. carrier partner's CRAF

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[66] However, as indicated in a forthcoming study by the Brattle Group, there have been instances even when close allies of the United States (including NATO members) have opposed certain U.S. military interventions. See "The Economic Impact of an EU-US Open Aviation Area," Chapter 8, at pages 8-9 (draft).

[67] See DOT Order 91-1-41.

[68] The identity/business objective of a foreign investor may affect its level of concern about a carrier's CRAF participation. For example, there have been cases in which foreign financial companies have made "arm's length" investments in a carrier that have triggered fitness reviews because of their sheer size. Our preliminary view is that these investments should not trigger unusual concern. The situation may be different if a foreign carrier were to invest in a U.S. carrier. For example, the homeland government of the foreign carrier might view that investment as an "extension" or reflection of its own views/policies. However, DOT always has considered the nationality of the foreign investor as a factor in approving/disapproving a proposed investment.

participation. There is no reason why this certification could not be part of a fitness review process when a carrier's ownership structure is changed. Another factor to consider is that the Committee on Foreign Investment in the United States ("CFIUS")—an inter-agency committee chaired by the Secretary of Treasury—already is in a position to review the national security implications of airline acquisitions. The President can exercise this authority to block a foreign acquisition of a U.S. corporation under certain circumstances.

It is uncertain whether there would be a groundswell of interest in increased foreign investment in U.S. airlines in the event limits on voting ownership were raised to 49%, but restrictions on control were to remain. With increased investment comes increased risk, which might prove unattractive without the contractual/legal rights to protect such investments. The General Accounting Office observed a decade ago that "[a]llowing foreign airlines to purchase up to 49 percent of the voting stock but denying them the right to exercise control commensurate with such an investment will likely attract few investors."[69]

The National Air Carrier Association and other industry participants have indicated that they oppose any change to current laws restricting foreign ownership, in part because such a move, in their view, might weaken CRAF, and might pave the way for further liberalization of access to the U.S. market, which NACA members oppose.

Despite certain misgivings about changing the rules which limit foreign ownership of U.S. airlines, there is some concern about the need of U.S. carriers for access to capital, especially during the course of a severe economic downturn. Although there has been much concern about the risks to U.S. interest posed by enhanced non-U.S. investment in U.S carriers, there is a commensurate, if not greater risk posed by the possibility that a large U.S. carrier will fail, and will deprive the CRAF program of vitally required lift. For example, United Airlines very recently filed for protection under the bankruptcy laws.[70] One of the possible sources of financing available to United would come from Lufthansa, United's alliance partner. Given the strong aeropolitical and geopolitical ties between Germany and the United States, the United States might determine that it prefers to see its second largest carrier survive, even if such survival is contingent upon relaxation of existing foreign ownership standards.

c. Right of Establishment

Under this scenario, a U.S. carrier could be owned 100% by foreign interests, but would be certified and operated under the laws of the United States. In this instance, aircraft operated by the carrier would be U.S. or "N" registered. The carrier would be subject to the full range of U.S. domestic laws, and its employees would be subject to domestic taxation, as would any other domestic carrier.[71]

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[69] See Airline Competition: Impact of Changing Foreign Investment and Control Limits on U.S. Airlines, U.S. General Accounting Office, December 1992, page 66.

[70] See In Re UAL Corporation, et al., Case Nos. 02-B-48191 through 02-B-48218, United States Bankruptcy Court for the Northern District of Illinois, Eastern Division (filed December 9, 2002).

[71] There is also the possibility that a U.S. certified airline could be incorporated in a country other than the United States. However, current law requires that U.S. airlines be incorporated in the United States, and there are strong jurisdictional reasons why the United States Government might want to retain this requirement, even if it were to wholly liberalize its ownership standards.

A concern that has been raised is what might happen if the homeland government of the U.S.-certificated but foreign-owned carrier were for some reason to oppose the carrier's CRAF participation, or activation in a particular case, and issue an order blocking its national from such participation. In such a circumstance, the carrier might be subjected to conflicting obligations.

There are two threshold questions raised by this possibility. The first question is why this eventuality is any more troublesome (or substantively different than) the possibility that a U.S. carrier might refuse to make its aircraft available where requested to do so by the Department of Defense. In both cases, the aircraft at issue would be "N" registered, which means that, in the event of a war, they would be subject to seizure by U.S. authorities under the Defense Production Act. Aside from aircraft registry, there are no special procedures in place to ensure that a U.S. carrier will make its aircraft available will do so in the event of a CRAF activation.

The second question deals with a related issue—which is why there would be special substantive concerns about such participation so long as participation in CRAF remains voluntary. Although it is quite difficult to predict the wartime situations that might arise, a fundamental point is that the "foreign" carrier that volunteers its aircraft to the CRAF program has in a very meaningful way demonstrated its sympathies to the United States.

Moreover, is it necessarily more problematic that a carrier refuses to comply with an activation because of political concerns than if it refuses to do so because it fears the negative business repercussions of such an event? Perhaps the compelling argument is that in the event of a commercial/financial concern, the U.S. Government can attempt to allay such concerns, whereas that option would not be viable in the event an activation were opposed on political grounds.

One point that warrants consideration is the desirability/attractiveness of CRAF participation if "foreign" ownership of U.S. airlines were to become widespread. If there were concern that the willingness to participate in CRAF might diminish under such a scenario, one of the options that should be considered in the event that U.S. law were amended to grant the right of establishment is to make the certification of such a carrier expressly conditional upon its participation in CRAF under commercially acceptable terms. Moreover, in the event such a carrier were to refuse to supply required aircraft in the event of a CRAF activation, the U.S. Government might wish to reserve the right to withdraw a carrier's certification without affording that carrier the protections and processes provided for under the Administrative Procedure Act ("APA").[72] With the removal of APA protections, and, perhaps, a legislative "finding" that refusal to cooperate with a CRAF activation might constitute an emergency that warrants immediate suspension or revocation of that carrier's operating authority, the Government would have a potent source of leverage to ensure CRAF participation.

Another of the options that was raised in the initial CRAF seminar in August was to impose heavy financial and legal penalties on the United States owners, managers, and directors of such

[72] 5 USC §§ 551, et. seq. The APA sets forth, among other things, the circumstances and procedures to which government-issued licenses and permits may be granted or revoked.

airlines for any failure to honor a CRAF activation so that such companies would have large incentives to comply with U.S. directives.[73]

While the risk of a foreign government issuing an order barring cooperation with a U.S. Government directive is not unforeseeable, there are ways in which the U.S. Government might mitigate the risk of such an eventuality. For example, the United States might accord enhanced investment privileges only to carriers from NAFTA signatories, members of the EU, and other friendly country groupings. Furthermore, if the investment were to take the form of an acquisition of an existing U.S. carrier, such an acquisition would be subject to CFIUS review.

2. Labor Position on Increased Foreign Ownership

The major airline/aviation unions were polled by letter and invited to a meeting to discuss the following questions:

- What is the union's view regarding increasing foreign ownership limits to 49%, given the difficult financial struggles of the major U.S. carriers?
- Would the right of establishment where a foreign party can establish or buy an existing air carrier, but be subject to all U.S. laws and rules as if a U.S. citizen, be something U.S. labor could consider?

The responses were generally very negative to both questions. While there was some flexibility indicated for increased ownership on a case-by-case basis, under no circumstances would any of the labor unions favor any control of a U.S. carrier by a foreign owner, especially if that owner was an airline. The concern is outsourcing jobs to foreign countries. Right of establishment was generally opposed as impractical, complicated and/or unworkable.

Additionally, labor has expressed concerns that multiple airlines could be owned by a common foreign owner if foreign ownership was permitted in the United States. Obviously, other countries would also have to relax their foreign ownership rules as well, but if that occurred labor's expressed concern focuses on the issue of common support and staff for the separately owned carriers held by a common foreign owner. While these carriers might be operated independently, they could use a variety of "pooled resources" from the lowest cost production point of their wholly owned network. It therefore follows, in labor's thinking, that if any U.S. carrier, regardless of ownership base, also owns a foreign carrier, they could then attempt to have their employees engage in wage competition against each other for work available in the corporate family.

Labor also addressed the question of applicable labor laws and operational regulations and requirements, assuming foreign carriers would be permitted U.S. ownership and control. Such laws and regulations, while clear in the U.S., become cloudy when considering multi-national operations

[73] This suggestion was tabled by Ms. Dorothy Robyn, member of the Brattle Group and former NEC staff member in the Clinton Administration. Chapter 8 of her study "The Economic Impact of an EU-US Open Aviation Area," (December 2002) addresses, among other things, the large degree of power the U.S. Government would exert over a foreign owned airline which is incorporated in the United States.

by the "mother carrier." "Flags of convenience" operations could well be the result with operations being based in the least restrictive regulatory environment and labor's view was that the margin of safety would always be a the lowest acceptable levels.

Labor laws pose an equally concerning dilemma for labor, especially in light of past U.S. court rulings that have undermined the clarity of applicability desired by labor. Specifically, a U.S. carrier, having employees based in a foreign location, would seem to be clearly bound by the U.S. Railway Labor Act for both collective bargaining and the resolution of grievances. Practice however has examples that clearly question that standard, starting with a court ruling that indicated that a foreign employee, always domiciled abroad in the service of a U.S carrier, did not have the same access to dispute resolution procedures that her U.S. fellow employees enjoyed. In another case, a U.S. cargo carrier was facing a representation election, but did have almost twenty (20%) percent of its employees based in Subic Bay. The carrier did not want the National Mediation Board ("NMB") to count the ballots of the "foreign domiciled" employees, even thought the employees were all U.S. citizens and were employed by a U.S. carrier and had "bid" into the foreign domicile under their current and valid collectively bargained agreement. The NMB actually avoided having to make the difficult choice by setting aside the ballots from the "Foreign Domicile," stating that they would make the decision ". . . only if the outcome could be changed by counting the remaining ballots." The outcome was decided by the domestic ballots, but the NMB's action and the ultimate result servers only to continue to obscure the problem.

3. Fly America as an Essential Incentive for CRAF Participation

a. Overview of the "Fly America" Act

The "Fly America Act," 49 U.S.C § 40118, requires any U.S. "department, agency, or instrumentality" to "take necessary steps to ensure" that it purchases any air transportation it requires from U.S.-certified airlines. This requirement is subject to condition that a U.S. carrier is authorized to provide the service and, in the case of transportation between the United States and a foreign point, such service is "available." With respect to services operated between two foreign points, such service must be "reasonably available."

The General Services Administration ("GSA") oversees the administration of the "Fly America" provisions. Among other things, the GSA has promulgated regulations that provide guidance for purchasers of air transportation to ensure they do not violate the statute.[74] These regulations, issued by GSA, define the terms "available" and "reasonably available," and provide guidance as to the circumstances under which the use of foreign air carrier lift is and is not appropriate.

The "Fly America" statute was first enacted in 1975, as part of the International Air Transportation Fair Competitive Practices Act.[75] Congress enacted the law in order to compensate for the fact that, at the time, "many foreign governments require[d] use of their carriers for official government transportation . . . ." Congress found that foreign carriers were dominating foreign-

[74] See Federal Travel Regulation, Use of Commercial Transportation, Fly America Act, 63 Fed. Reg. 63417 (November 13, 1998), and 41 CFR Part 301.

[75] See Public Law 93-623, January 3, 1975.

originating business and government air traffic, and determined that a preference for U.S. carriers was needed in order to "counterbalance some of the disparity."[76]

The law was amended when Congress passed the International Air Transportation Competition Act of 1979.[77] There were two substantive changes made to the law at that time. First, the general prohibition against the use of foreign carriers was relaxed to the extent that U.S. flag carrier services between two foreign points were not "reasonably available." The law also authorized the U.S. Government to "negotiate the right to carry U.S. Government-financed passenger traffic…with foreign governments in return for liberal bilateral agreements benefiting the traveling public and U.S. air carriers."[78] Specifically, the law permits the U.S. Government to exchange the right to transport Government-financed traffic with U.S. trading partners to the extent such an agreement "provides for the exchange of rights or benefits of similar magnitude."[79] It was emphasized, however, that U.S. negotiators were not to guarantee "specific dollar amounts of U.S. Government-financed traffic in any negotiation."

b. Challenges to Foreign Carriage of "Fly America" Traffic

Although a review of the ways in which "Fly America" has been interpreted and applied over the years is beyond the scope of this analysis, it is germane to examine the debate that took place during the early and mid-1990s concerning the ability of foreign airlines to transport U.S. Government-financed traffic pursuant to a code sharing arrangement with a U.S. carrier. On several occasions, opponents objected to code sharing on the grounds that, in certain cases, it served as a means by which foreign carriers could circumvent Fly America restrictions. According to the opponents, codesharing undermined the integrity of the "Fly America" program, which was cited as a primary incentive for U.S. carriers to participate in CRAF.

In the early 1990s, the State Department requested from the Comptroller General a ruling as to whether a U.S. carrier (Continental Airlines) might transport U.S. Government traffic between the U.S. and Scandinavia pursuant to a code sharing arrangement with its foreign code share partner (Scandinavian Airlines System). Under this arrangement, the Continental "CO" airline code was to appear on the entire movement, even though Continental itself was not providing direct service to Scandinavia. The Comptroller General determined that, although the U.S. carrier did not operate each leg of the service, the flight nevertheless qualified as a service "provided" by a U.S. air carrier.[80]

The National Air Carrier Association ("NACA") petitioned for reconsideration of the Comptroller General's decision, arguing for various reasons that the decision violated both the Fly America statute and the National Airlift Policy. The Comptroller General rejected that contention.[81]

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[76] See House Report 93-1475, reprinted in 1974 U.S. Code Congressional and Administrative News 7461.
[77] See Public Law 96-192, signed February 5, 1980.
[78] See Senate Report 96-329, reprinted in 1980 U.S. Code Congressional and Administrative News 54, at 65-66.
[79] See 49 U.S.C § 40118 (b)(2).
[80] Matter of Fly America Act - Code Sharing - Transportation By A U.S. Carrier, 70 Comp. Gen. 713, September 25, 1991 (B-240956).
[81] See Letter to Edward J. Driscoll from Robert Murphy, Acting General Counsel, General Accounting Office, dated July 14, 1994 (B-240956.4).

This issue was far from resolved, however. Partially in response to an earlier decision of both American and United to withdraw from the CRAF program, the GSA in 1994 imposed upon carriers looking to bid on contracts under the City-Pair program a requirement that such carriers be CRAF participants. American Airlines filed a bid protest, stating that, if GSA were to adopt such a requirement, it could not permit U.S. carriers to use code sharing services operated by their foreign partners to fulfill their obligations, because foreign airlines are, by definition, not CRAF participants.[82] The Comptroller General rejected those arguments, and dismissed the protest.

Over the years, there have been several efforts made to curtail non-U.S. carriers' participation in the movement in Government-financed traffic. In 1995, Senator Wendell Ford, who was then Chairman of the Senate Aviation Subcommittee, introduced legislation (S. 1037), which would have required that Fly America transportation be provided "on an aircraft that is owned or leased by a United States citizen, and is operated by a U.S. citizen." That legislation was not enacted.

Although there have been no recent attempts to revisit this issue, U.S. carriers occasionally do voice dissatisfaction with the ability of non-U.S. airlines to participate in "Fly America" movements. (This issue was raised by at least one U.S. carrier at the August 2002 CRAF seminar hosted by IDA.) The reasons given for this opposition is that there are real costs associated with CRAF participation, and few incentives for CRAF participation other than the city-pair program.[83] Moreover, U.S. carriers cite a lack of commensurate opportunities to transport the Government-financed traffic of other countries as a disincentive for granting foreign carriers access to such U.S. traffic.

Much of the discussion above addresses the possibility that a foreign investor and/or its government would object to a U.S. carrier's continuing participation in CRAF. Although it may be difficult to anticipate geopolitical issues that might be raised, there is considerable evidence that, patriotism aside, U.S. carriers view their CRAF participation as commercially attractive, and this would probably be equally true if a U.S. carrier was substantially owned by foreign nationals.

There have been conflicting statements made about the value/utility of the "city pairs" program as an incentive for CRAF participation. On the one hand, the U.S. Government has made CRAF participation a prerequisite for participation in the "City Pairs" program. On the other hand, several of the major U.S. carriers have said that this program is not an incentive to participate in CRAF, and that there are other factors at play. Moreover, it is important to note that the "Fly America" program, which provided that only U.S. carriers may carry U.S. Government traffic, plays

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[82] See Letter dated July 6, 1994 from Thomas Hill to Beryl Hanne, Contracting Officer, General Services Administration.

[83] In testimony before the Aviation Subcommittee of the Senate Commerce, Science and Transportation Committee, Ronald W. Allen, Chairman of Delta Air Lines, stated:

> In order to qualify as a bidder for carriage of official government travel, U.S. carriers must be participants in the Civil Reserve Air Fleet (CRAF) program. Participation in the CRAF program requires carriers to commit a minimum of 30% of their total long-haul passenger aircraft to the Department of Defense for use in time of military emergency . . . .
>
> Carriers involved with the CRAF program have an obligation to maintain a fleet of aircraft that can be used in time of emergency by the U.S. Government. In return, the U.S. Government should support the commercial operations of that fleet.

See Statement of Ronald W. Allen, May 24, 1995, at 8.

an economic role only in the context of foreign air transportation, since foreign air carriers would as a matter of law be prohibited from competing for domestic air transport contracts.

c. Bilateral Air Service Issues

As mentioned above, the Fly America Act contains a provision which enables U.S. negotiators to exchange the right to transport such traffic with other countries, so long as such exchange "provides for the exchange of rights or benefits of similar magnitude."[84]

According to our review of all recent and major bilateral air service agreements, such rights have been exchanged exceedingly rarely. It appears that the only bilateral air service agreements which provide for the exchange of such rights are the U.S.-Saudi Arabia bilateral air service agreement, and the U.S.-Brazil bilateral air service agreement. The U.S.-Saudi Arabia Agreement provides as follows:

> The designated airlines of the Contracting Parties shall have the right, in accordance with their designations and route authority, to compete for the transportation of all third and fourth freedom government contract passenger and cargo traffic. Government contract traffic is that traffic for which payment to a designated airline for the carriage of passengers and cargo is made by the government contractor providing goods or services to that government (including federal state, local, municipal or other government entities).

Air Transport Agreement Between the Government of the United States of America and the Government of the Kingdom of Saudi Arabia, signed October 2, 1993, Annex 4. The U.S.-Brazil Agreement provides for the right of carriers of each side, on the basis of reciprocity, to compete for the right to transport nonmilitary cargo being shipped between the two countries.[85]

Several other foreign nations have sought the right for their carriers to U.S. Government-financed traffic. The United Kingdom on several occasions has stated that such a provision must be incorporated in any "Open Skies" Agreement it might reach with the United States, despite the fact that the United States has not extended such traffic rights to its other European "Open Skies" partners.

As indicated earlier, the European Court of Justice last month issued a decision which invalidated several of the provisions of the bilateral air service agreements between the United States and several EU member states. The EU has since demanded that these member states renounce their current air service agreements with the United States, and confer upon the European Commission the mandate to negotiate a new multilateral agreement with the United States on their behalf. Although the United States and EU have not yet specified in full detail the precise elements they would like to include in an eventual U.S.-EU air service agreement, the Association of European Airlines has proposed a "Transatlantic Common Aviation Area" which would permit carriers of each side to compete for traffic without restriction.

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[84] 49 USC § 40118(b).

[85] See Agreement Between the Government of the United States of America and the Government of the Federative Republic of Brazil, Annex III.

d. Conclusions and Recommendations

The legislative history of the "Fly America" Act does not reveal any express intent on the part of Congress to use "Fly America" restrictions as an incentive for U.S. carriers to participate in CRAF. Congress at the time appeared to be reacting primarily to a perceived imbalance in the competitive opportunities available to U.S. and foreign carriers. This interpretation is supported by the fact that in 1980, Congress agreed to allow the U.S. Government to exchange the right to transport government-financed traffic with other countries, so long as U.S. carriers were able to obtain rights of roughly commensurate value.

In reviewing "Fly America," however, it is important to draw the appropriate inference from the fact that the U.S. Government has largely declined to engage in such bilateral exchanges. In our view, this resistance tends to suggest that there is a paucity of opportunities available for U.S. carriers. Moreover, the major U.S. carriers are quite firm in their belief that without having preferential (if not exclusive) access to the opportunities to carry Fly America traffic, there would be little financial incentive to participate in CRAF. (The smaller carriers also have access to peacetime AMC flying.)

It would be useful to examine the extent to which foreign governments continue to restrict the right to carry "official" traffic to their own flag carriers. Moreover, it would be useful to obtain more concrete and objective data about the relative values U.S. carriers place on their access to flying in U.S. domestic city-pairs (which are unaffected by Fly America issues) versus the flying performed in international city-pairs. This information would help the United States Government determine whether it should even entertain the prospect of exchanging access to government-financed traffic in the context of a multilateral aviation agreement with the European Union, or in any future aviation agreement. Given the hardship cited by several carriers in the wake of the CRAF activation in the early 1990's, and the decision of American and United to end their participation in CRAF (this turned out to be temporary), DoD is understandably reluctant to make material changes to the incentives for CRAF participation that are in place.[86]

[86] For a discussion of the hardships associated with CRAF participation, and DoD's attempts to respond to those concerns, see "The Civil Reserve Air Fleet: Trends And Selected Issues," Roger K. Coffey and F. Ronald Frola, Logistics Management Institute, May 1996, at 2-3 through 2-7.

Appendix C

EVOLVING TRENDS IN THE AVIATION INDUSTRY AND THE IMPLICATIONS FOR CRAF

Frank Berardino
Aleksandra Lazic

GRA

A. INTRODUCTION

GRA has been tasked with assisting IDA in two areas related to the commercial airline industry in the United States and its current and future participation in the Civil Reserve Air Fleet (CRAF) program:

- Develop a forecast of the availability of CRAF-relevant aircraft, including both long-range passenger and long-range cargo vehicles.

- Develop a model to assess carrier incentives to participate in CRAF, and how participation rates may be affected by either external events or changes in the CRAF program.

In undertaking this assignment, GRA has relied on inputs provided by industry sources including the Federal Aviation Administration, the Air Transport Association, Department of Transportation, and independent research developed by investment banking institutions. GRA also has relied on inputs provided by IDA, and its other subcontractors including Morten Beyer & Agnew and Eclat Consulting.

The following are GRA's findings:

- Through 2010, there will be sufficient aircraft in the US fleet to support CRAF missions.

- There will be fewer 4- and 3-engine wide-body aircraft in the US passenger fleets in the future; the multiplicity of gateways in international markets, the increased use of RJ's and the ascendancy of new business model discount carriers in domestic markets are the primary drivers towards smaller aircraft overall and twin-engine wide-bodies in particular.

- There will be modest or little growth in 4-engine wide-body aircraft in US cargo fleets through 2010; integrators (express carriers) will continue to grow faster than other scheduled and charter operators resulting in greater dependence on twin- and 3-engine wide-bodies. An exception is Federal Express' order for ten A-380 aircraft.

- Over the next five years, given current credit ratings with associated expected default rates, approximately 18 percent of the CRAF passenger fleet may be at risk in reorganization proceedings, while 8 percent of the cargo fleet may be at risk.

- The incentives model built for this work program identifies the trade-offs faced by carriers when deciding whether and at what level to participate in CRAF. In general, the model identifies two groups of carriers – charter and scheduled – whose behavior can be expected to vary widely.

- Charter operators are primarily motivated by the opportunity to fly cargo and passenger missions for AMC in peacetime. They participate in teams and pay commissions to scheduled operators (in exchange for MV points) to maximize their charter flying for AMC. Charter operators generally have less viable opportunities in the commercial sector than scheduled operators; they become increasing dependent of peacetime flying as the business cycle turns down. Under most circumstances, these carriers have an incentive to maximize their level of CRAF participation in order to maximize their opportunity for peacetime flying and make themselves more valuable to their scheduled team members.

    - In the cargo sector, if as a result of the added C17 buy the expected peacetime charters decline significantly or are reduced to zero, the viability of cargo charter carriers would be threatened. Their ability to respond during a call-up may be reduced because they may not be able to support the same number of aircraft solely with commercial opportunities.

- During good economic times (e.g., year 2000),[87] scheduled operators participate in CRAF primarily to become eligible for other government business – the city-pair program for passenger operators and the Cat A charter and express contracts for cargo operators. Because their opportunities in the commercial sector are lucrative, scheduled operators tend to avoid flying peacetime missions for DoD, and depend on their charter partners to satisfy AMC peacetime needs.

- There are two distinct categories of scheduled operators:

    - Type A Scheduled Operators, which include most scheduled passenger carriers and one key scheduled cargo airline (FedEx), find there are insufficient incentives during normal economic times to induce commitments to CRAF above the minimum eligibility thresholds for related government business (30 percent for express and city-pair programs; 15 percent for the CAT A program).

        - This outcome is largely unaffected by the existence of the AMC peacetime buy; the commissions scheduled carriers earn are insufficient to offset the risk of losses during call-ups.

    - Type B scheduled cargo operators do not participate in the express contract but do commit a large percentage of their aircraft to CRAF because the profitability of flying during a call-up equals or exceeds the expected profitability in the commercial sector; these

[87] Year 2000 was a record profit year for the airline industry.

carriers are largely unaffected by the AMC peacetime charter buy or by the express contract.

- During economic downturns (e.g., when unit revenues decline by 10 to 15 percent or more as they have in the past 12 months), Type A scheduled cargo and passenger operators find the CRAF incentives more attractive. The model suggests that these carriers would increase their participation beyond the minimum needed to be eligible for other government business.

    - This outcome is directly affected by the existence of the AMC peacetime buy; scheduled carriers have incentives to increase their participation beyond the minimum eligibility levels (e.g. for city pair and express 30 percent) only if they can earn commissions from their charter partners. Furthermore, the charter partners provide a buffer against early call-ups; in their absence, scheduled operators may perceive that the risk of call-ups increases and this will further reduce their incentives to increase participation.

    - CRAF participation by Type B scheduled cargo operators is less affected by the economic cycle.

- The following tables illustrate the effects of changes in commercial prospects on the incentives for scheduled and charter carriers to participate in CRAF. During good economic times, the incremental benefits for Type A scheduled cargo and passenger carriers of committing more than 30 percent of their fleets are essentially the additional commissions they will earn from their charter partners; but, for Type A scheduled carriers, the offsetting risk of being called up during a crisis with the resulting disruption in commercial operations exceed the incremental benefits of participation beyond 30 percent of their fleets. In contrast, Type B scheduled cargo operators and both passenger and cargo charter operators do not vary their participation in CRAF due to changes in economic circumstances.

Table 1.

Scenario	Millions of Ton Miles/Day			Millions of Pax Miles/Day		
	Cargo			Passenger		
	Charter	Scheduled	Total	Charter	Scheduled	Total
Actual CRAF Commitments, October 2002	16.8	22.2	39	8	188	196
CRAF Commitments with Degradation in Commercial Rates	16.8	22.2	39	8	188	196
CRAF Commitments at Year 2000 Commercial Rates	16.8	11.4	28.2	8	60.2	68.2

- The table illustrates a point of vulnerability in the current CRAF program; because DOD cannot control the commercial economic prospects of its participants, it is potentially vulnerable to withdrawals by Type A scheduled cargo and passenger operators.

- The fact that Type A carriers have historically participated at higher than the minimum 30 percent level suggests that they may look at CRAF as having counter-cyclical benefits; when the economy is poor or there is a world crisis, more CRAF participation is attractive. Since crises and economic downturns are difficult to forecast precisely, carriers may elect to participate at higher levels throughout the cycle. But, if the peacetime buy were eliminated, this counter-cyclical benefit would be diminished. On net, CRAF participation would be likely to fall.

- If the C17 buy results in the elimination of peacetime cargo charters, then the participation of charter operators is threatened. During robust or less favorable economic times, the following table suggests that there may be a shortfall in the CRAF cargo program in both good and poor economic times.

Table 2.

Scenarios	Million Ton Miles/Day		
	Cargo		
	Charter	Scheduled	Total
CRAF Commitments with Degradation on Commercial Rates (economic downturn) and without Peace Time Buy	0-9.8	11.4	11.4-21.2
CRAF Commitments at Year 2000 Commercial Rates (robust economy) and without Peace Time Buy	0-9.8	11.4	11.4-21.2

The following table suggests that elimination of the peacetime cargo buy could cause a decrease in participation of Type A passenger carriers during economic downturns due to the loss of commissions. The outcome depends on the severity of economic crisis and is different for different carriers. In the following table, we assume a uniform 10 or 15 percent decline in unit rates for passenger carriers.88

[88] In Table 1, the degradation in rates is carrier specific. Here, it is assumed to be uniform across all carriers.

Table 3.

Scenarios: variation in the severity of economic downturns	Million Passenger Miles/Day		
	Charter	Scheduled	Total
Degradation in Commercial Rates by 10 percent (with Cargo Peacetime Buy)	8	98.3	106.3
Degradation in Commercial Rates by 10 percent (without Cargo Peacetime Buy)	8	60.2	68.2
Degradation in Commercial Rates by 15 percent (with Cargo Peacetime Buy)	8	140.7	148.7
Degradation in Commercial Rates by 15 percent (without Cargo Peacetime Buy)	8	98.3	106.3

- If the commercial rates of Type A passenger carriers were degraded by 10 percent due to an economic slowdown, some carriers would increase their participation in CRAF above 30 percent while other carriers would not. Eliminating the cargo peacetime buy causes carriers that would otherwise have CRAF commitments above 30 percent to reduce their commitments to the 30 percent level. A more severe economic crisis (15 percent) causes even more carriers to increase their CRAF participation level above 30 percent. The elimination of cargo peacetime buy and the loss of commissions returns the CRAF commitments to the 30 percent fleet level for some carriers while for others, the losses in commercial sector are so severe that they commit above 30 percent of their fleet even when the cargo peacetime buy is eliminated.

- An important outcome of the modeling is that increasing the minimum participation levels for the city-pair, express and Cat A contracts results in parallel increases in participation. This outcome is durable—i.e., it survives fairly robust increases in the profit margins available to carriers in the commercial sector—and it is under the control of DOD. It may also provide a means to address possible shortfalls in the passenger program in the case of a shutdown of a major carrier (e.g., United). Consideration should be given to increasing the minimum participation levels for the express and city-pair contracts to higher levels to meet CRAF requirements. Modeling suggests that in the absence of the cargo fixed and expansion buy, minimum thresholds of 86-87 percent for the express contracts pursued by Type A cargo carriers (FedEx) and 48 percent (or 63 percent without United) for the city-pair contract would meet projected requirements during a call-up.

    - The eligibility process could also be altered so that aircraft counted for Cat A eligibility could not be used to also cover express eligibility. Modeling suggests, for example, that participation increases to 45 percent of fleets if cargo carriers had to meet both a 30 percent eligibility criterion for express and an additional 15 percent for CAT A cargo.

- ✈ Finally, it should be noted that AMC can maintain participation levels over the business cycle by paying higher rates during call-ups; this reduces the expected carrier losses during call-ups and makes the current program more attractive. This may be particularly important if the peacetime buy for cargo is eliminated.

    - o Review of the incentive model suggest that in the absence of the peacetime fixed and expansion cargo charters, increasing participation rates for Type A scheduled cargo operators might require increases in call-up rates of as much as 40 percent during good times. Assuming that carriers average their expectations over the business cycle, increases of 20-30 percent might be sufficient.

    - o Increases in the call-up rates of 20-30 percent during good times, or 15-25 percent over the cycle should be sufficient to increase participation of scheduled passenger operators.

- No change would be necessary for Type B scheduled cargo or for charter-passenger or charter-cargo operators.

The remainder of this report is organized as follows. The next section discusses our conclusions concerning the availability of CRAF-relevant aircraft in the time period 2002–2010. The third section of the report describes the CRAF-incentives model developed by GRA for this work program. Finally, the fourth section describes results of scenario runs of the model.

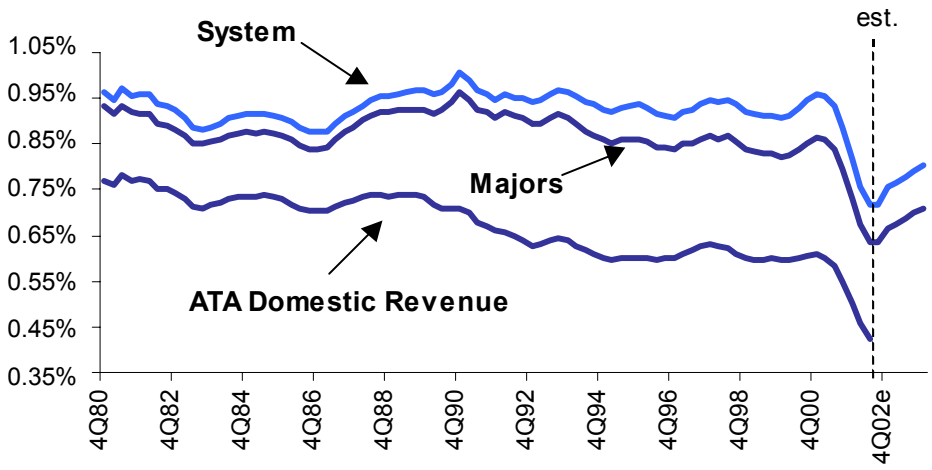
B. FORECAST OF THE AVAILABILITY OF CRAF-RELEVANT AIRCRAFT

The events of September 11, 2001 together with the downturn in the business cycle preceding it resulted in a substantial and unprecedented decline in passenger airline profits and also had important impacts on cargo carriers. In this section, GRA reviews the implications of these events together with the longer-term trends in the commercial airline industry, with an eye towards forming conclusions about the implications for the availability of CRAF-relevant aircraft for long-range passenger and cargo missions in the future.

1. Commercial Passenger Aviation

Since deregulation in the late 1970s, there has been a fairly consistent relationship between gross domestic product and airline revenues. Figure 1 shows that until 2001, airline system revenues ran at approximately 0.95 percent of GDP. Then, the combination of the recession and the events of September 11th disconnected that relationship. Currently, airline revenues are running approximately 26 percent below levels one would expect given the current levels of GDP.

Figure 1. Passenger Airlines Disconnect from the Economy



Source: DOT Form 41; ATA Yield Report; Carrier Financial Statements
Passenger revenue as a percentage of nominal GDP (3Q02-4Q03 estimates)

Most analysts now believe that some of the disconnection between airline passenger revenues and GDP may be permanent. An analysis developed by Eclat distinguishes between cyclical factors and more structural change in the aviation market, which may result in a permanent deficit in airline passenger revenues going forward. Perhaps among the most important factors are:

- The continued rapid growth of new business-model, low-fare carriers; Table 4 shows that national carriers like Air Tran, Frontier, JetBlue, and Spirit have grown rapidly since September 11 (averaging a 17 percent increase) even while the major carriers have shrunk on a year over year basis.

- The availability of airline passenger fares on the Internet which allows consumers to search more efficiently for the lowest priced service.

Table 4. National Passenger Carriers Have Outperformed the Majors

	August, 2002					August, 2001		
	Revenue Passenger Miles	*Change*	Available Seat Miles	*Change*	Load Factor	Revenue Passenger Miles	Available Seat Miles	Load Factor
Total - Majors	**57,180**	***-9.0%***	**73,716**	***-8.9%***	**77.6%**	**62,850**	**80,954**	**77.6%**
Nationals								
Airtran	520	*19.3%*	743	*22.6%*	70.0%	436	606	71.9%
Frontier	336	*20.2%*	538	*22.7%*	62.5%	280	439	63.8%
JetBlue	689	*103.5%*	761	*94.6%*	90.5%	338	391	86.5%
Midway Airlines-E	0	*-100.0%*	0	*-100.0%*		140	200	70.0%
Spirit	411	*11.8%*	527	*15.5%*	78.0%	368	457	80.5%
Vanguard-E	0	*-100.0%*	0	*-100.0%*		109	153	71.2%
Total - Nationals	**1,956**	***17.1%***	**2,570**	***14.4%***	**76.1%**	**1,670**	**2,245**	**74.4%**
Total - Regionals	**2,401**	***16.6%***	**3,639**	***14.1%***	**66.0%**	**2,059**	**3,188**	**64.6%**
Grand Total	**61,536**	**-7.6%**	**79,925**	**-7.5%**	**77.0%**	**66,579**	**86,388**	**77.1%**

As a result, the Air Transport Association now expects that passenger airline revenue will stabilize at about 0.85 percent of GDP some time in 2004 (see Figure 2). Most Wall Street analysts now believe that passenger carriers will not show positive profits until at least 2004. Measured on an ASM basis, the industry will have lost at least four or perhaps as many as five years of growth as a result of the recession and the impact of the events of September 11th (see Figures 3 and 4).

Figure 2. Evidence Suggests Disconnect from Cyclical Factors

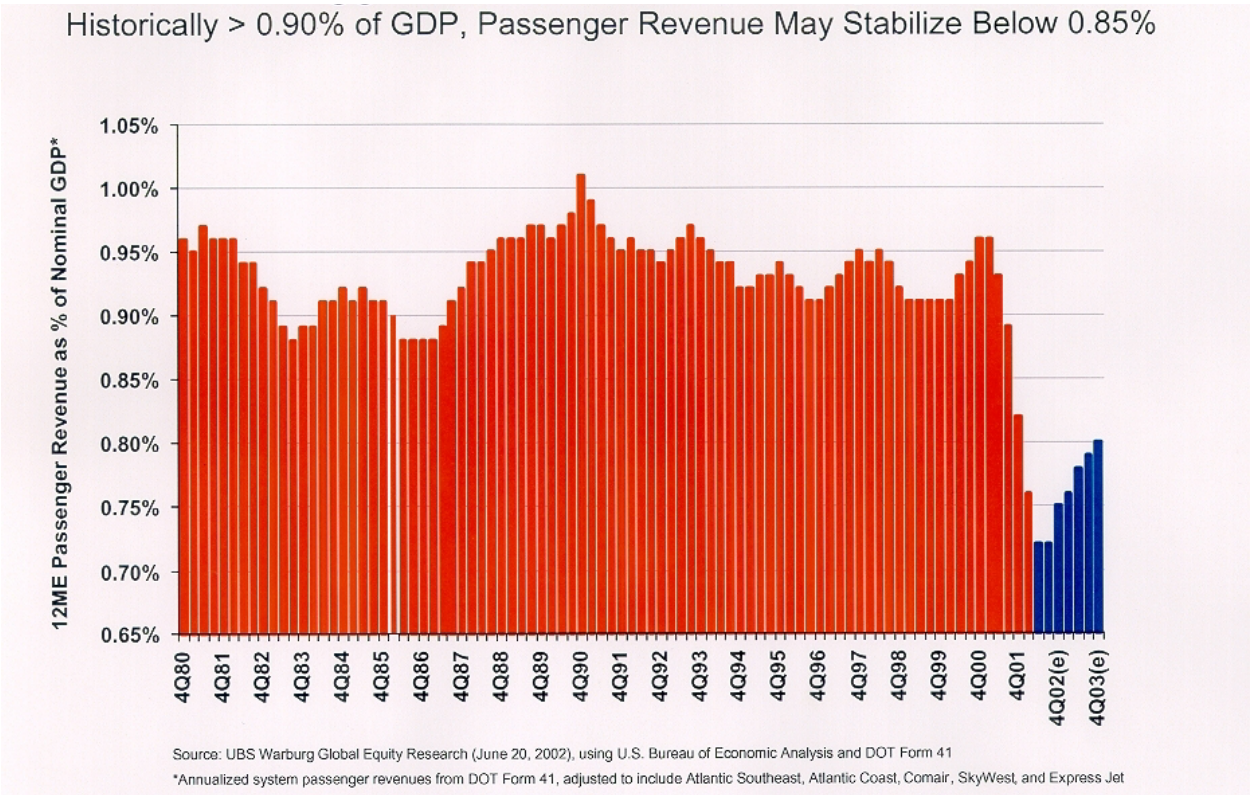
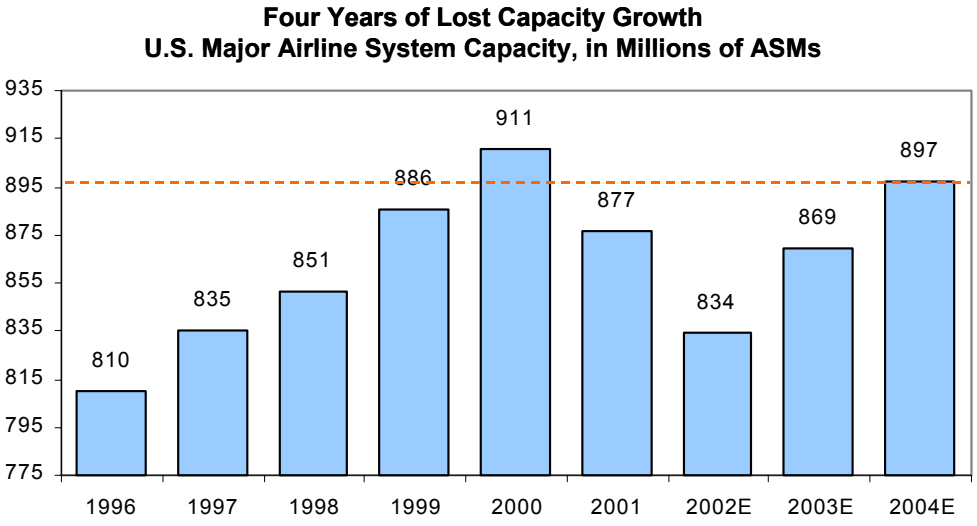
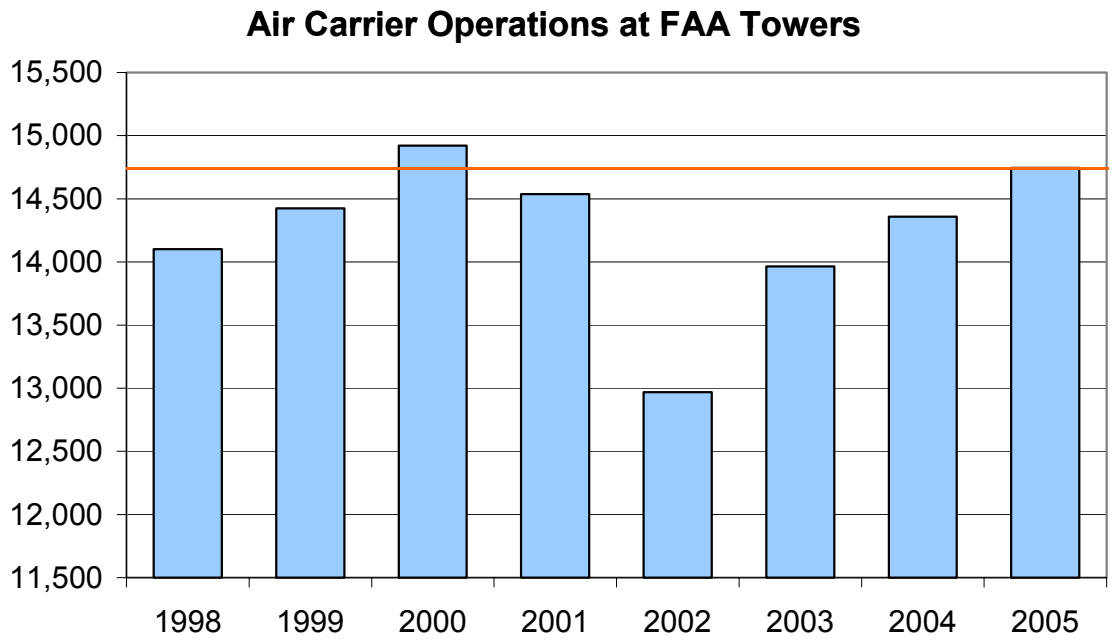


Figure 3. Airlines Stand Still Until 2004



Source: Goldman Sachs Research estimates

Figure 4. FAA Forecasts Air Carrier Operations Will Return to Year 2000 Levels in 2005



a. Longer Term Trends in Commercial Passenger Aviation. There has been a fairly consistent pattern of change in the composition of the fleets of US commercial passenger air carriers since the mid 1990s. This is illustrated in the top portion of Table 5, developed by the FAA. Since the mid 1990s, there has been a very large increase in regional jets, as hub and spoke carriers have reduced the number of turboprops in their fleets and used regional jets to substitute for standard body aircraft in smaller markets. Since September 11, the major carriers have reduced average aircraft size across the board. So, for example, markets formerly served by the smallest standard jets (100 seats) are now being served by regional jets. Similarly, markets formerly served by very large aircraft (e.g., B747) are now being served by smaller 3-engine or 2-engine aircraft. The top part of Table 5 demonstrates that these post-September 11 changes are merely the acceleration of trends that already existed.

Table 5. FAA Forecasts Decline in the Largest Wide-Body Passenger Aircraft

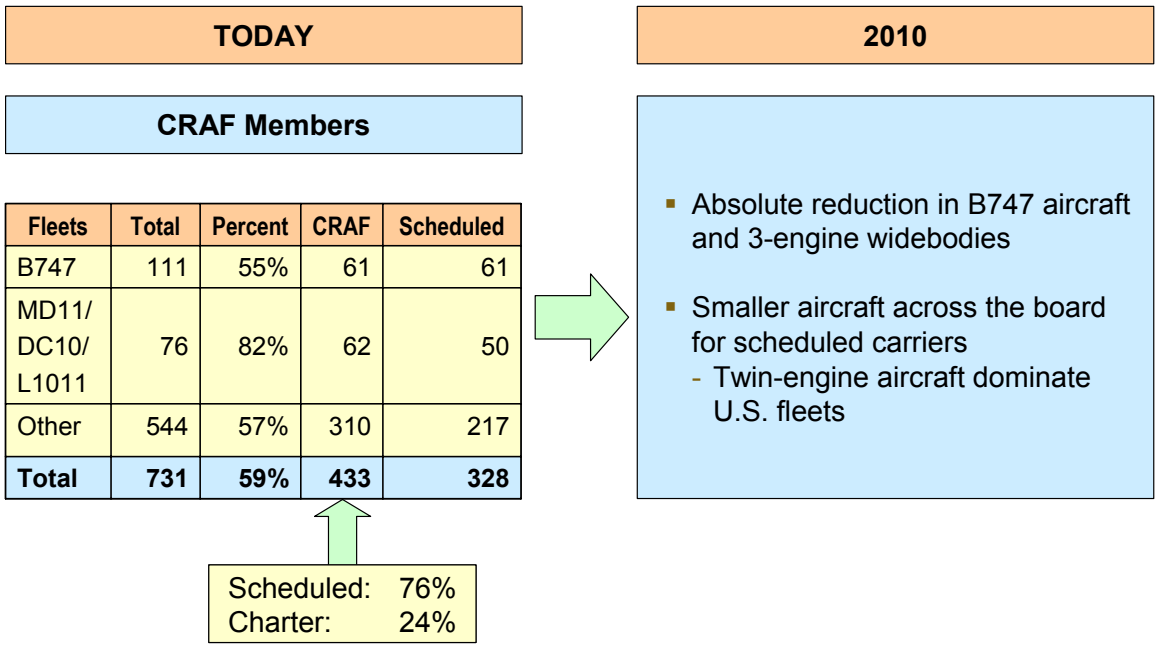
FAA FORECASTS
U.S. COMMERCIAL AIR CARRIERS
PASSENGER JET AIRCRAFT

CALENDAR	LARGE NARROWBODY			LARGE WIDEBODY			REGIONAL	
YEAR	2 ENGINE	3 ENGINE	4 ENGINE	2 ENGINE	3 ENGINE	4 ENGINE	JETS	TOTAL
Historical*								
1996	2,810	537	47	262	258	143	62	4,119
1997	2,824	532	37	288	243	139	108	4,171
1998	2,949	508	32	309	226	122	221	4,367
1999	3,139	436	21	361	204	129	365	4,655
2000	3,362	385	19	424	169	123	542	5,024
2001E	3,244	142	17	460	98	108	732	4,801
CAGR (Historic)	2.9%	-23.4%	-18.4%	11.9%	-17.6%	-5.5%	63.8%	3.1%
Forecast								
2002	3,226	126	12	484	97	110	858	4,913
2003	3,261	113	2	507	86	110	1,025	5,104
2004	3,317	100	2	534	80	110	1,192	5,335
2005	3,382	93	2	556	70	111	1,363	5,577
2006	3,445	91	2	580	67	113	1,545	5,843
2007	3,537	91	2	610	64	113	1,698	6,115
2008	3,688	91	2	639	60	112	1,846	6,438
2009	3,852	92	2	659	56	110	2,028	6,799
2010	4,056	92	2	686	53	108	2,273	7,270
2011	4,191	92	2	719	49	106	2,492	7,651
2012	4,362	92	2	750	44	103	2,714	8,067
2013	4,594	92	2	772	41	105	2,930	8,536
CAGR	3.3%	-2.8%	-15.0%	4.3%	-7.5%	-0.4%	11.8%	5.2%

Large wide-body aircraft are the airplanes of most relevance to CRAF. US carriers have moved aggressively to acquire more modern 2-engine, long-haul aircraft including B767 and B777s. The FAA forecast shows continuation of this trend so that by 2010, of the 847 large wide-body aircraft in US passenger fleets, 686 or 81 percent will be 2-engine airplanes.

GRA concurs with the general trends illustrated in the FAA forecast. Our own conclusions are illustrated in Figure 5. The left side of the Figure shows the current composition of the CRAF passenger fleet for long-range missions as of October 2002. The very large aircraft (B747s) and 3-engine wide-body aircraft are explicitly shown on the chart. We expect that both of these categories of aircraft will decline in absolute numbers by 2010. There is a strong likelihood that US airlines will have only a relative handful of B747 aircraft in their fleets by 2010, mostly to serve Asian traffic. Even here, United Airlines has announced a very large and permanent reduction in its B747 fleet with direct implications for CRAF.

Figure 5. Long-Range Passenger Forecast



At the same time, GRA expects US carriers to substitute B767 and B777 aircraft as well as A330 2-engine aircraft into their fleets. These aircraft range in passenger capacity between approximately 220 and 300 seats.

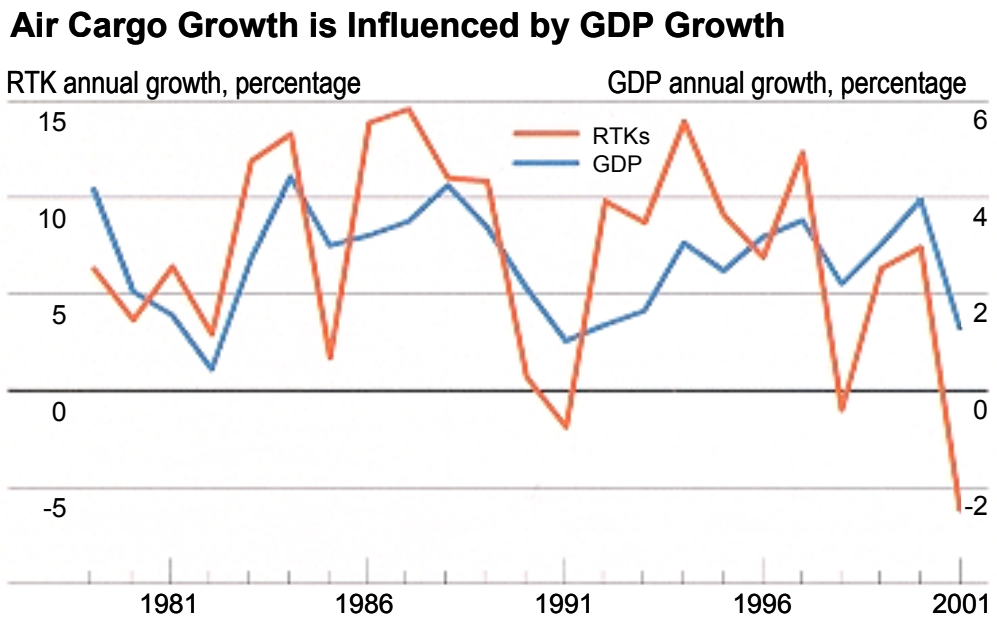
The main implications for CRAF will be that the average unit available for the transportation of troops will decline in the future. This in turn may have implications for loading and unloading troops in the field, with the main issue being available ramp space at transfer points or within the theaters at issue during a call-up.

2. Air Cargo

The disconnection between the economy and the air cargo industry has been less severe than in the passenger sector. This is illustrated in Figure 6. Revenue ton kilometers in the air cargo industry grow fairly consistently with changes in gross domestic product. The downturn in the latter in 2001 caused a recession in the air cargo industry, but the relative impacts were modest when compared with the passenger sectors. In examining these data, it is important to distinguish between integrated air cargo companies (such as UPS and FedEx) that provide door-to-door service for express and small packages and more traditional all cargo carriers (either scheduled or charter) that carry larger shipments. The integrators dominate the worldwide air cargo market. Their dominance in the United States is further accentuated due to the greater reliance on these carriers for the transportation of inventories and goods both in the manufacturing sector (for just-in-time processes) and in the consumer market (where Internet and catalog sales have become an important part of consumption patterns). The integrators are large, well-capitalized firms. Their credit ratings have remained largely unaffected, despite the

impacts of the recession and the events of September 11th. The integrators participate in CRAF, but do not typically fly a substantial portion of the missions during peacetime. Their participation becomes most important during call-ups when their very large fleets become available for military emergencies.

Figure 6. Air Cargo Disconnection Has Been Less Severe



In contrast, other more traditional all cargo carriers (both scheduled and charter) have been affected by the recession (negatively) and by the events of September 11th and the follow-on actions in Afghanistan (positively). In general, these firms have much lower credit ratings, and are much less well capitalized. Some of the firms have applied for loans from the Air Transportation Stabilization Board, citing difficulties accessing private capital. In general, there has been a secular decline over the past 20 years in the economic prospects for these firms. But, their role in CRAF is critical because they provide most of the peacetime flying and also volunteer for additional missions (including expansion and in early call-up phases).

In the future, GRA expects that the integrator businesses will stay connected to the economy and grow. The business prospects for the other airlines will remain episodic. At present, these firms are doing relatively well by providing services to AMC and because of the shortfall in capacity caused by the west coast dock strike. These other airlines also provide ACMI services to larger carriers as well as scheduled and semi-scheduled services for freight forwarders. These lines of business share a common characteristic in that their correlation with the economy is more tenuous and internally demand has varied widely.

a. Longer Term Prospects in the All Cargo Market. Boeing forecasts that the US will maintain its share of the world freighter fleet (see Figure 7) and that average freighter capacity will continue to rise for the next 20 years. Both of these developments should be seen as being positive for CRAF.

However, the Boeing forecast also shows that despite an average annual growth rate of 6.5 percent, the US share of revenue ton kilometers will decline over the next 20 years. In GRA's view, this is due in part to the fact that in the United States, integrators will continue to dominate the market and their share of the freighter fleet will increase. Because integrators operate hub and spoke networks focusing on smaller size shipments, they tend to utilize smaller aircraft than other scheduled and charter operators (see Figure 9). Furthermore, the Boeing forecast also contemplates that the structural imbalances in loads in intercontinental shipping will remain in place for the next 20 years. Figure 10 illustrates these imbalances for the Asian market. Loads originating in Asia and traveling east to the United States currently exceed westbound shipments from the United States by approximately 37 percent. The Boeing forecast projects that this imbalance will remain in the future. This in turn will impact other (non-integrator) scheduled operators as well as charter operators in the United States. These firms' access to this traffic may be hindered by increasing competition by more market-oriented foreign firms whose home market originates more of the traffic.

Figure 7. Boeing Forecasts that the US Will Maintain Its Share of the World Freighter Fleet

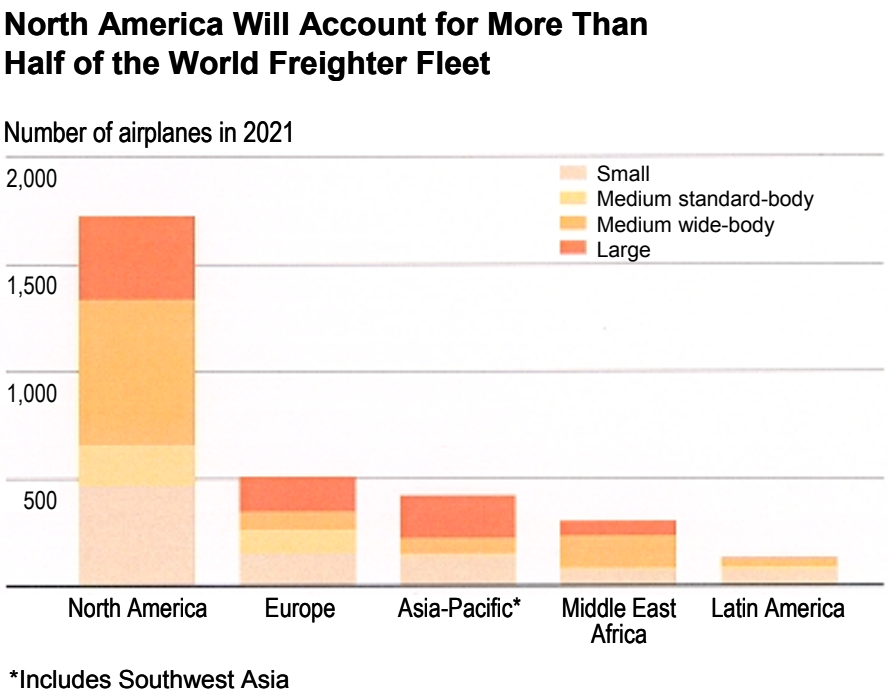


Figure 8. Boeing Forecasts that Average Freight Capacity will Continue to Rise

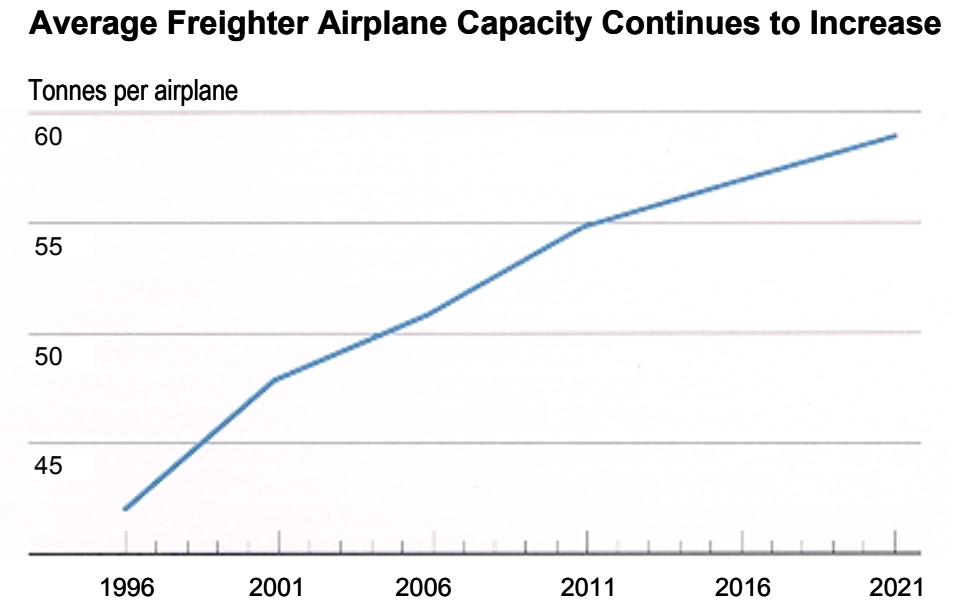
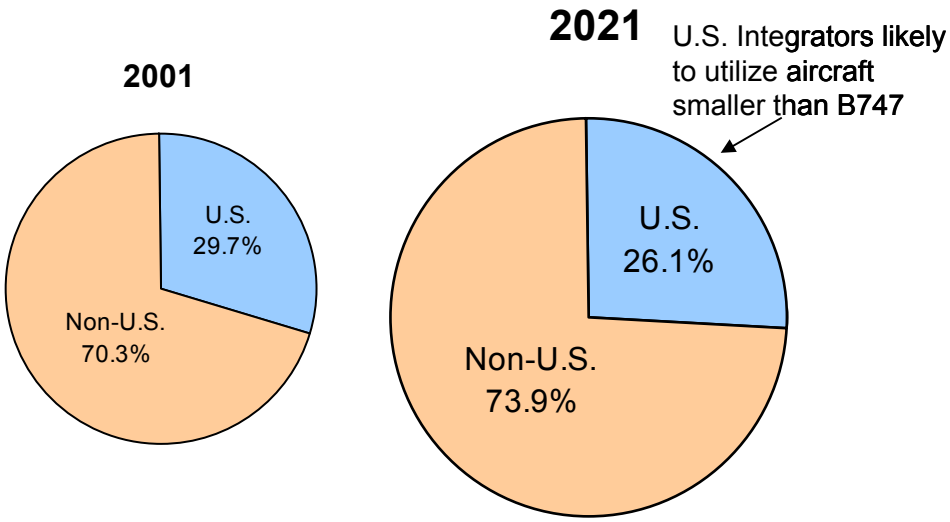
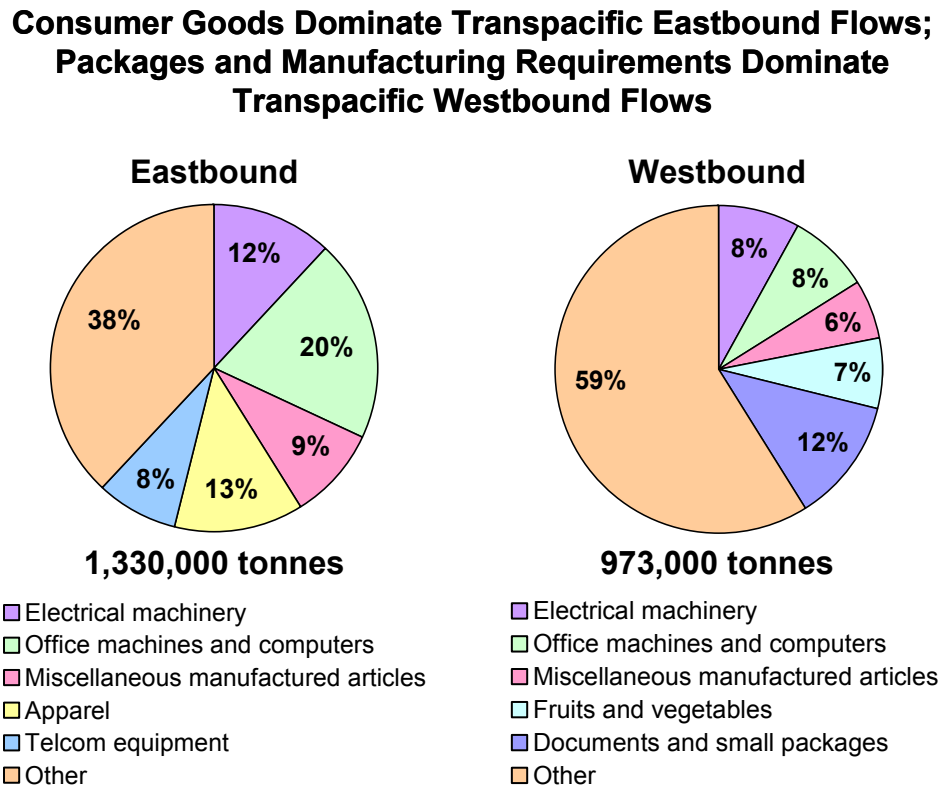


Figure 9. Over Two Thirds of the World RTK's will Continue to be Flown by Foreign Carriers Who Dominate Long Haul



U.S. integrators continue to use hub/spoke systems which deploy smaller aircraft

Figure 10. Imbalance in Loads Continues to Affect Smaller US Carriers



The consequences for the CRAF fleet are evident in part in the FAA forecast for all cargo aircraft illustrated in Table 6. The all cargo fleet in the United States has been growing rapidly, especially in the large wide-body category where 4-engine, 3-engine and 2-engine aircraft have all been increasing substantially. The growth in 4-engine and 3-engine aircraft is particularly important for CRAF because these airplanes are capable of carrying the relatively heavy loads that characterize military shipments during call-ups. In contrast, 2-engine aircraft are less able to carry heavy loads because they are certificated at lower levels of shipment density due to a need for the aircraft to remain safe in flight even during engine out scenarios. In the future, the FAA is predicting a secular movement towards the 2-engine cargo aircraft, but still shows significant growth in the 3-engine and 4-engine wide-body categories.

GRA generally concurs with the FAA forecast. Our conclusions are shown in Figure 11. The left side of the Figure illustrates the current CRAF cargo long-range fleet with integrators comprising 52 percent of the total Stage III aircraft. The integrators have a very large percentage of the 3-engine aircraft, and a much smaller share of the B747 fleet. By 2010, because their businesses will be growing faster and because they use smaller units, GRA believes that the integrators will account for a larger share of the CRAF-potential fleet resident in the United States. This share may increase to approximately 65 percent. Furthermore, because integrators are unlikely to increase their utilization of B747 aircraft, the absolute number of these aircraft available to CRAF is unlikely to

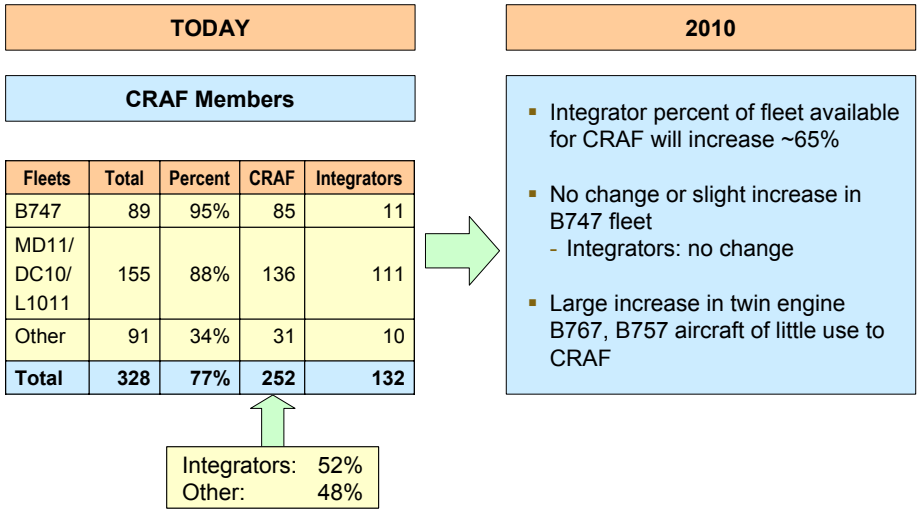
increase substantially by 2010. It should be noted, however, that FedEx has a firm commitment to acquire ten A-380 freighter aircraft, which are larger than the B747s. Overall, GRA sees a relatively large increase in twin-engine cargo aircraft, which are of less use to CRAF for the reasons described earlier.

Table 6. FAA Forecasts Modest Growth in Large Wide-Body Cargo Aircraft

U.S. Commercial Air Carriers
Cargo Jet Aircraft

CALENDAR YEAR	LARGE NARROWBODY			LARGE WIDEBODY			TOTAL	Annual Pct TOTAL
	2 ENGINE	3 ENGINE	4 ENGINE	2 ENGINE	3 ENGINE	4 ENGINE		
~~Historical~~								
1996	149	319	201	66	72	43	850	
1997	160	322	199	86	111	40	918	8.0%
1998	166	326	197	111	123	44	967	5.3%
1999	172	338	185	134	147	53	1,029	6.4%
2000	166	332	166	164	158	68	1,054	2.4%
2001E	163	281	158	183	183	71	1,039	-1.4%
CAGR (Historic)	1.8%	-2.5%	-4.7%	22.6%	20.5%	10.5%	4.1%	
~~Forecast~~								
2002	165	286	162	194	183	76	1,066	2.6%
2003	165	286	162	220	197	78	1,108	3.9%
2004	165	288	160	249	213	81	1,156	4.3%
2005	165	283	157	275	227	87	1,194	3.3%
2006	165	278	154	302	242	91	1,232	3.2%
2007	165	273	152	336	259	95	1,280	3.9%
2008	165	263	149	372	276	99	1,324	3.4%
2009	165	263	146	404	293	103	1,374	3.8%
2010	165	264	143	433	310	107	1,422	3.5%
2011	165	264	140	461	326	111	1,467	3.2%
2012	165	264	137	489	343	115	1,513	3.1%
2013	165	264	134	517	360	119	1,559	3.0%
CAGR (Forecast)	0.0%	-0.7%	-1.7%	9.3%	6.3%	4.2%	3.5%	

Figure 11. Long-Range Cargo Forecast



3. Summary

GRA's overall forecast is summarized in Figure 12. In general, GRA perceives more business cycle risk in the passenger segment with an overall bumping down in average aircraft size, resulting in smaller units available to CRAF. Some carriers may be vulnerable to reorganization, especially in the event of an Iraq war. Smaller new business-model airlines will continue to compete, further reinforcing trends towards smaller aircraft in the industry. Larger carriers will continue to deploy RJ aircraft as part of this overall trend.

Figure 12. Forecast Summary

FAA Forecast: CRAF Relevant Fleet to 2010	Comments	Commercial Prospects for CRAF Members
Passenger **250-300 Seat Aircraft Dominate** 2 engine widebody: +42% 3 engine widebody: -45% 4 engine widebody: 0%	**Passenger:** ✈ Expected recovery to 2000 levels of operation and modest profits in 2004 or 2005 ✈ Continued reduction in average aircraft size ✈ Move to smaller units may accelerate faster than predicted by FAA	✈ Business cycle risk - Shrinkage of large aircraft fleets ✈ Some carriers potentially at risk if Iraq conflict occurs ✈ New business model airlines challenge continues
Cargo **All Increase** 2 engine widebody: +123% 3 engine widebody: +69% 4 engine widebody: +41%	**Cargo:** ✈ Continued ascendancy of integrators ✈ Other businesses may not recover as quickly ✈ Foreign carriers become stronger competitors ✈ FAA's four-engine widebody increase in doubt	✈ All carriers except integrators dependent on AMC business - CRAF is vulnerable to business cycle risk: could disrupt teaming arrangements which depend on smaller carriers to fly peacetime missions

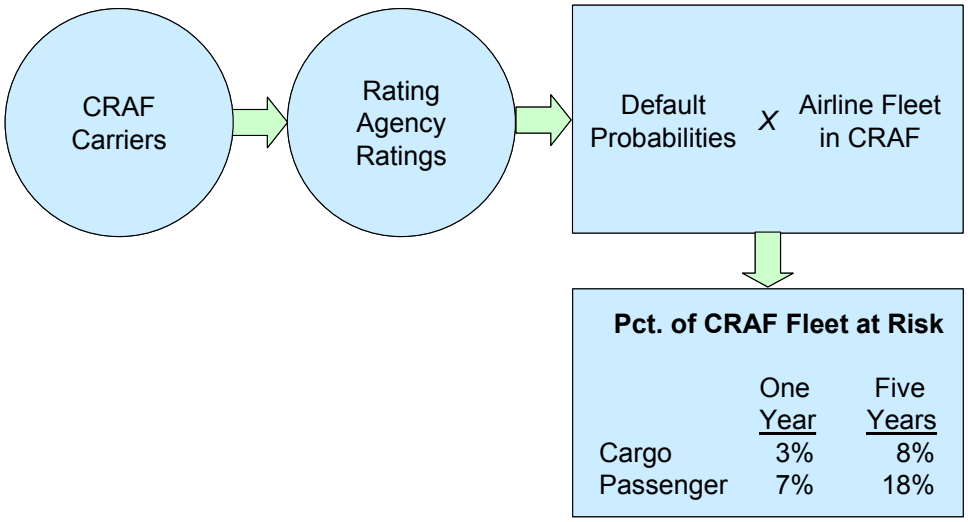
In the cargo market, many of the non-integrator carriers are dependent (in part) on AMC business continuing at relatively high levels. These airlines' ability to continue to deploy large B747 aircraft depends importantly on CRAF business in the future. Their business prospects tend to be episodic, and these firms may not grow as quickly as the economy.

Finally, an important issue for CRAF is whether the recent downtown in the economy and the resulting adverse impact on both passenger and cargo carriers will have a substantial impact on the number of aircraft available to CRAF in the next few years. To address this question, GRA acquired ratings developed by Standard & Poor's and Moody's for companies involved in CRAF. Over 90 percent of the aircraft in the CRAF fleet are operated by companies covered by the rating agencies. Associated with the ratings are default studies also published by these rating agencies. Virtually all of the passenger airlines involved in CRAF and some of the freight airlines have received one or more downgradings since September 11. As a consequence, their probability of default has increased. This may mean that there is a greater chance that some carriers might lose

control of these aircraft during bankruptcy proceedings, with obvious consequences for CRAF.

The studies provide information on the probability of default within 12 months and within 60 months for each rated company. GRA multiplied these probabilities by the number of aircraft each carrier had in CRAF as of October 2002. The result shown in Figure 13 is an expected percent of the CRAF fleet that might be subject to default proceedings in those two time periods. The numbers suggest that only a very small percentage of the cargo fleet is at risk, reflecting the better market prospects for cargo carriers in general and the very high credit ratings for UPS and FedEx, which dominate this category. For passenger aircraft, a higher percentage of the fleet is at risk, reflecting poorer prospects across the board for passenger airlines and the substantial debt load these companies have taken on since September 11. Given the very high levels of over-subscription in the passenger fleet, however, this does not represent an important threat to CRAF.

Figure 13. Current CRAF Fleet Potentially Vulnerable to the Business Cycle



C. CRAF-INCENTIVE MODEL

The second major component of the GRA assignment for IDA was to develop a model of an airline's decision to participate in the CRAF program. The model is designed to be sensitive to the various economic incentives that carriers have to participate in the program. The model assumes that carriers seek to maximize their profits (or in this case, their contribution to overhead) in making this decision. The model is designed to be sensitive to as many of the incentives to participate in the CRAF program as there could be defined, including:

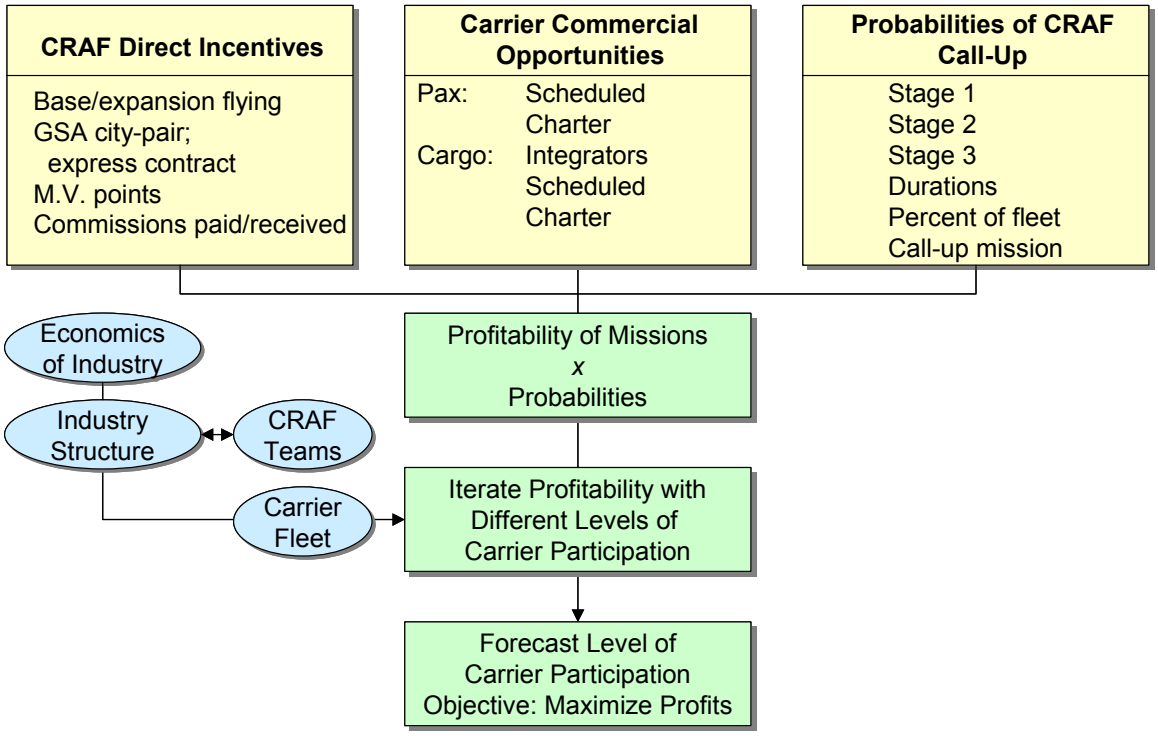
- The mission definition and rates paid by AMC for fixed, expansion and call-up missions
- The mix of peacetime missions between fixed and expansion
- The possible reduction in AMC peacetime buys due to the increase in the number of C17s in the Air Force fleet, or other factors.

- Incentives for carriers to participate in order to become eligible for GSA city-pair programs (for passenger airlines) and the domestic and international express contracts let by the federal government
- The impact of points assigned to specific aircraft when they are committed to the CRAF program
- The impact of allowing carriers to sell or trade points within a team structure
- The effects of increased probability of call-ups due either to external threats or changes in other factors
- Changes in industry structure, including potential international involvement in CRAF.

The factors involved in the model are shown in Figure 14. The model is built based upon the commercial cost structure and revenue earned by each carrier as reported to the DOT on Form 41. These data are utilized to characterize the typical mission profile flown by each firm. Data are designed to identify:

- Average load (measured in tons or passengers)
- Revenue per ton mile or per passenger mile
- Average one-way mission length
- Number of intermediate stops
- Number of block hours involved in each mission
- Direct operating costs per hour
- Number of commercial missions each day

Figure 14. Modeling Incentives



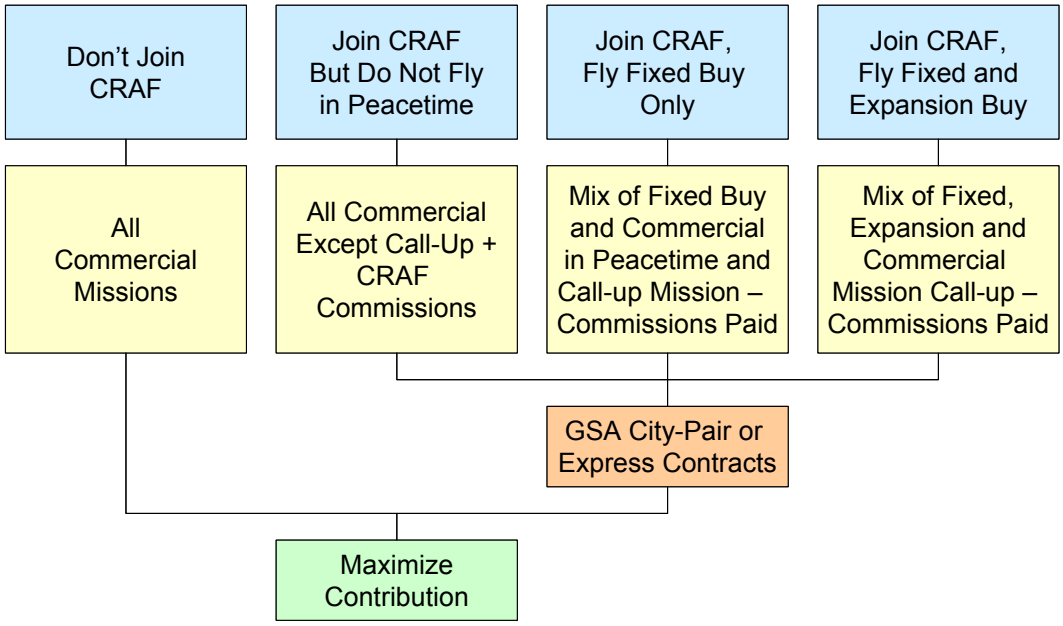
These data are designed to develop estimates of the contribution (revenues less direct operating costs including aircraft ownership) for the typical commercial mission flown by a CRAF airline with a specific type of aircraft.

Form 41 data also are utilized to develop estimates of the carrier's costs for flying both CRAF peacetime and call-up missions. The mission profiles actually incorporated in AMC RFPs were utilized to characterize the missions for the fixed and expansion buys. The mission profiles flown during the Gulf War were used to characterize call-up missions that might be flown by these carriers during wartime. Mission profiles include one-way miles, number of stops, block hours, layover hours, number of missions per day, and other factors needed to calculate expected contribution for each of these AMC missions by a specific carrier flying a specific type of aircraft.

With these data in hand, the model then examines the opportunities available to the carrier to participate in the CRAF program. Figure 15 illustrates the four opportunities available to each carrier for each type of aircraft in its fleet; the carrier can:

- Not join CRAF at all
- Join CRAF but not fly during peacetime
- Join CRAF and fly fixed buy missions only
- Join CRAF and fly fixed and expansion buy missions

Figure 15. Carrier Decision-Making



If the carrier elects to not join CRAF, then the model assumes it flies only commercial missions with its available fleet. If instead, the carrier elects to join CRAF, it:

- May become eligible for the GSA city-pair or express contracts (if it meets the minimum commitment levels to CRAF)
- Will receive commission payments from other carriers if it elects not to fly any peacetime missions by selling its MV points to other team members or to other carriers outside of its team
- Pay commissions to carriers if it elects to fly more CRAF peacetime missions than would be available to it if it utilized only its own points

The carriers select among the four opportunities the one that maximizes its own contribution (or profit).

In order to better model the airline's decision-making, the model examines the contributions for each of the four opportunities by adding each of the carrier's CRAF-eligible aircraft to the CRAF program one at a time. So for example, if a carrier has ten CRAF-eligible aircraft, the model looks at all levels of participation beginning with zero aircraft committed to CRAF through ten.

The model begins by looking first at the Stage 3 level of participation. If a carrier elects to participate in Stage 3, the model then works backwards to identify the levels of participation for Stage 2 and Stage 1. In each case it takes into account the eligibility requirements for CRAF, including the minimum levels required for Stage 1. The model then reports results in terms of the number of aircraft committed to each stage, given the underlying assumptions in the model.

Table 7 provides an example of an output sheet for a particular aircraft type operated by a particular airline. Shown at the top of the page are the total fleet count and the number of aircraft the model projects the carrier would commit to CRAF. Also shown is an indication of whether the carrier would fly peacetime missions. The assumptions regarding the level of the fixed and expansion buys and the total GSA contracts this carrier would be eligible to participate in are also shown.

Table 7. Sample Model Output

Model:

Aircraft Type	B747-100F		
Airline			
Type of Carrier	Charter All Cargo		
Summary	***Stage 3***	***Stage 2***	***Stage 1***
Total Fleet	5	5	5
Aircraft in CRAF	5	1	1
	Carrier Doesn't Fly Peacetime	Carrier Flies in Peacetime	Carrier Doesn't Fly Peacetime
	Fixed Buy	Expansion	Total
	$75,000,000	$95,000,000	$170,000,000
Percent Aircraft Needed to be Eligible for CRAF	Probability of Stage 1 Percent of CRAF Fleet Duration (days)		2% 100% 270
	Probabilty of Stage 2 Percent of CRAF Fleet Duration (days)		2% 50% 270
	Probabilty of Stage 3 Percent of CRAF Fleet Duration (days)		0.10% 100% 60
Actual Aircraft in CRAF	***Stage 3***	***Stage 2***	***Stage 1***
	5	2	1

Also reported is information on each stage of call-up. For each stage, the model assumes:

- A probability of being called up
- The percent of the carrier's fleet that would be called up
- The duration of the call-up.

In the base case, the model assumes that the probability of a Stage 1 or Stage 2 call-up is approximately two percent per year. This reflects the fact that in the approximate 50-year history of CRAF, a Stage 1 and Stage 2 call-up (in the Gulf War) occurred once. The duration of the call-up for both stages was approximately 270 days. One hundred percent of the Stage 1 fleet was called up and approximately 50 percent of the Stage 2 fleet was called up. The model assumes that the probability of a Stage 3 call-up is much less – on the order of 0.1 percent. It also assumes that the duration of the Stage 3 call-up would be much shorter – on the order of 60 days.

The carrier's expected profit contribution depends upon these probabilities, duration of call-up and the percentage of their fleet that would be called up in each stage. The model calculates the expected contribution that the carrier would earn from the call-up missions given its level of participation in the CRAF program. The carrier's total contributions are a function of:

- The commercial missions it flies
- The peacetime AMC missions it flies
- Any missions it flies under a call-up weighted by the assigned probabilities indicated.

Also shown at the bottom of the Table 7 is additional information on the actual number of aircraft that the carrier has committed to CRAF as of October 2002.

1. Defining the Profitability of Each Type of Mission

The following three equations define the profitability of each type of mission included in the model. Equation (1) shows the contribution for commercial missions.

(1) ***Commercial Mission:*** *(Contribution per Mission) x (Number of Aircraft) x (Number of missions per Day)*

The total contribution that a firm can earn from commercial missions is a product of the contribution per mission multiplied by the number of aircraft available in the fleet multiplied by the number of missions those aircraft can fly per day.

The contributions that a firm can earn from fixed buy AMC missions is shown in Equation 2:

(2) ***Fixed Buy Mission:*** *(Contributions per Mission) x (Missions Flown) – (Commission Paid)*

where

Mission Flown = [Total Fixed Buy] x [(Own Share) + (Team Share)] /

(Revenue per Mission)

and where

Commission Paid = (Team Share – Own Share) x (Total Fixed Buy) x (Commission Rate)[89]

As can be seen, the contribution from the fixed buy mission is a function of the contribution that the firm can earn per mission flown multiplied by the number of missions it will fly less the commissions it pays (if any) to other team members. The number of missions available to be flown by a carrier depends on the total fixed buy, the

[89] It should be noted that the commission payments include commissions a passenger airline receives from charter cargo airlines flying peacetime missions (or from passenger charters if an airline receiving commissions is a cargo carrier).

carrier's own share, the team share (including both passenger and cargo members) allocated to that carrier, divided by the revenue that the carrier earns per mission. The model checks for the capacity of the carrier to fly the missions (measured by the number of aircraft available to CRAF and limits the number of missions to the level that the aircraft at issue could possibly fly). The commissions paid by the carrier depend upon the team share, its own share, the total fixed buy and the commission rate it pays.

The method for calculating the contribution for the expansion buy is identical.

Finally, the contribution that a firm can earn from a call-up mission is illustrated in Equation 3.

(3) ***Call-Up Mission:*** *(Contribution per Mission) x (Number of Aircraft) x (Number of Missions Per Day)*

As can be seen, the contribution a carrier earns from a call-up mission is a function of the contribution per mission multiplied by the number of aircraft called up multiplied by the number of missions that an aircraft can fly per day.

Figure 15 illustrates that the carrier faces four opportunities with respect to CRAF. Each of them presents a different profit opportunity. The model selects the highest profit opportunity given the number of aircraft that might be allocated to CRAF. Those profit opportunities are defined in the following equations:

(4) ***Do Not Join CRAF:*** *Commercial Mission Contribution*

(5) ***Join But Do Not Fly in Peacetime:*** *$(1 - P_1 - P_2 - P_3)$ (Commercial Mission Contribution) + P_1 (Stage 1 Call-Up Mission Contribution) + P_2 (Stage 2 Call-Up Mission Contribution) + P_3 (Stage 3 Call-Up Mission Contribution)*

(6) ***Join, Fly Fixed Buy Missions:*** *$(1 - P_1 - P_2 - P_3)$ (Commercial Mission Contribution + Fixed Buy Mission Contribution) + P_1 (Stage 1 Call-Up Mission Contribution) + P_2 (Stage 2 Call-Up Mission Contribution) + P_3 (Stage 3 Call-Up Mission Contribution)*

(7) ***Join, Fly Both Fixed and Expansion Buy Missions:*** *$(1 - P_1 - P_2 - P_3)$ (Commercial Mission Contribution + Fixed Buy Mission Contribution + Expansion Buy Contribution) + P_1 (Stage 1 Call-Up Mission Contribution) + P_2 (Stage 2 Call-Up Mission Contribution) + P_3 (Stage 3 Call-Up Mission Contribution).*

As can be seen from the preceding, if a carrier elects to join CRAF, the contributions (profits) it earns depends importantly upon the probability of Stage 1, Stage 2, and Stage 3 call-ups (labeled respectively, P1, P2, and P3) as well as on the contributions that the carrier will earn for each of the four mission types examined in the model – commercial missions, fixed buy missions, expansion missions, and call-up missions.

Recall that the model looks at all of the possible levels of participation in the CRAF program; for a carrier with ten CRAF eligible aircraft, the model would look at levels of participation ranging from zero aircraft to ten. For each level of participation, the model will identify the most profitable opportunity available to the carrier. It then will select among the levels of participation the global profit maximizing opportunity. That will then define the level of participation in Stage 3.

The model then looks at minimum participation levels for Stages 1 and 2, given the level of participation identified for Stage 3. It takes account of minimum participation levels to be eligible for the GSA city-pair contract (passengers) or the domestic and international express contracts and Category A charter program (for cargo carriers).

2. Benchmarking

GRA benchmarked the model against actual carrier participation. The results are shown in Table 8. For both cargo and passenger carriers, the actual fleet is defined as the total number of aircraft that are CRAF eligible for the airlines included in the sample analysis. Also reported is the number of those aircraft actually committed to CRAF as of October 2002. Finally, the last column reports the number of aircraft that the model shows these same carriers committing to Stage 3 of the CRAF program.

TABLE 8. MODEL CLOSELY REPLICATES CARRIER BEHAVIOR

	Sample of CRAF Carriers in GRA Model		
	CRAF Participants		
	Actual Fleet	Actual in CRAF	Model in CRAF
Cargo	216	213	216
Passenger	224	158	224

As can be seen, the general pattern of commitment among the carriers in the sample is similar to what the carriers actually do. The distinction between the actual levels of participation and the levels predicted by the model is due to logistical and other business issues that cannot be easily captured in the generalized model. For example, some carriers will choose to keep some of their eligible aircraft out of CRAF as a contingency against a call-up. In effect, there is some minimum level of aircraft that they will elect to keep in the commercial sector even during a Stage 3 call-up. These decisions are beyond the scope of a generalized model. To account for this issue, we have limited carriers to their current (October 2002) aircraft pledges.

D. SCENARIO RUNS OF THE MODEL

The current CRAF long-range international cargo and passenger commitments produce the following Stage 3 levels of daily production.

Table 9. CRAF Stage 3 Production Levels

(Millions)

Cargo (Millions of Ton Miles Per Day)	Passengers (Millions of Passenger Miles Per Day
39	196

The incentives model incorporates a sample of carriers and their specific aircraft as allocated to CRAF in October, 2002. Stage 3 production levels of the carriers included in the sample are as follows:

TABLE 10. STAGE 3 PRODUCTION OF CARRIERS INCLUDED IN THE INCENTIVES MODEL

(Millions)

Cargo (Millions of Ton Miles Per Day)	Passengers (Millions of Passenger Miles Per Day
32.17	88.10

Multiple runs of the incentives models were made for the cargo and passenger programs. The results are reported in terms of the percentage change in Stage 3 productivity in the sample. These same percentage changes are then applied to the population to derive impacts on the ability of the CRAF program to fulfill its missions under the demand side scenarios developed by IDA. Those alternative demand side scenarios are reported immediately below in Table 11.

Table 11. IDA Demand Side Scenarios

A. CARGO

Prudent wartime cargo planning basis for CRAF	20 +/- MTM/D
High Case	up to 30 MTM/D
Low Case	as low as 10MTM/D

B. PASSENGER

Prudent wartime planning basis for CRAF	100 MPM/D
High Case	up to 120 MPM/D
Low Case	as low as 80 MPM/D

1. Cargo Base Case

In the base case, the following key assumptions are made[90]:

- AMC fixed buy = $75 million per year
- AMC expansion buy = $95 million per year
- The available government express contract amount = $133,000,000 per year
- Carriers are paid 27.55 cents per ton mile and $3,000 per stop when flying for AMC
- The one-way fixed cargo rate set at 175 percent
- The one-way expansion cargo rate is set at 175 percent
- Express carriers must commit 30 percent of their long-range fleet to CRAF to be eligible for both the domestic and international express contracts; they must commit 25 percent to be eligible for those contracts individually.
- Carriers are assumed to earn a commercial rate per ton-mile reported in Form 41 for the year ended December 2000 (the last full year of data before the events of 9/11).
- Direct operating costs (including ownership) are taken from Form 41 for year ended December 2000.
- CRAF commitments are as reported for the year beginning October 2002.
- The probability of a Stage 1 call-up is two percent with the average duration of 270 days (the CRAF program is approximately 50 years old with one call-up lasting 270 days).
- The probability of a Stage 2 call-up is also two percent with a 270 duration but with only 50 percent of the Stage 2 commitment called (this also is based on the Gulf War experience).
- The probability of a Stage 3 call-up is 0.1 percent with an average duration of 60 days, but with 100 percent of the CRAF fleet called.

The model has been calibrated so that the full productivity of the CRAF fleet in Stage 3 as reported in Table 9 would be realized.[91] Our model sample is equivalent to 32.2 MTM/D, which corresponds to 39 MTM/D or the current level of commitment for the population. The population represents all the aircraft currently committed by all air carriers to the long-range international cargo sector.

Table 12 summarizes sensitivity runs of the incentives model, which are discussed below.

[90] The one-way fixed and expansion cargo rates are found in Air Mobility Command's Final Uniform rates and Rules for International Service, Fiscal Year 2002.

[91] This was done by reducing the commercial rates for one of the carriers

2. Base Case With a Three Percent Stage 1 Probability

Increasing the probability of a Stage 1 call-up from 2 percent to 3 percent decreases the total MTM/D from 39 to 30.9.

3. Base Case With a Probability of Stage 1 Call-Up of Ten Percent

If the probability of a Stage 1 call-up increased from two percent to ten percent, there are substantial effects on CRAF commitments. Total daily productivity of the CRAF fleet would be 28.2 million ton-miles per day. This is enough to fulfill the Prudent and Low Case wartime cargo planning requirements. However, there is a short fall of about 2 MTM/D for the High Case MTM/D requirement estimates.

4. Effect on Charter Operators if Team Points Cannot Be Bought or Sold

Integrated carriers and scheduled operators would continue to make commitments to the CRAF program at base case levels if they did not receive commission payments from charter operators. However, without access to team member points, the charter operators would be likely to reduce their CRAF commitments because a significant portion of their fleets are in place to serve AMC peace time needs. These carriers may be unable to find viable commercial opportunities and as a result, they may be forced to park their aircraft, which would reduce their usefulness to CRAF.

It is estimated that approximately 42 percent (16.4 MTM/D) of the base case cargo productivity would be lost if charter carriers were unable to purchase points from their larger team members. The resulting 22.6 MTM/D would satisfy the Prudent and Low Case requirements but would fail to satisfy the High Case requirement of 30 MTM/D (refer to Table 11).

Table 12. Model Outputs for Cargo

Scenarios	Comments	Results (MTM/D)
1) Base Case (Commercial rate (rev/rtm) adjusted so that all A/C are committed to CRAF	All Carriers in CRAF	Population = 39 Sample = 32.17 Projected = 39
2) Commercial Rate raised by 10%	Type A Cargo Carrier commits 30% of its fleet; the rest commit 100%	Population = 39 Sample = 21.4 Projected = 28.2
3) Scenario 2 with rates paid to FedEx during call up increased by 10 percent	Same as base case	Population = 39 Sample = 32.17 Projected = 39
4) Scenario 2 with minimum express commitment increased from 30% to 60%	Type A Cargo Carrier commits 60% of its fleet; the rest commit 100%	Population = 39 Sample = 26.1 Projected = 32.9
5) Scenario 2 with Category A minimum commitment set 15% above minimum express cargo commitment		Population = 39 Sample =23.7 Projected = 30.5
6) Scenario 2 and Commissions increased to 9%	All Carriers in at 100%	Population = 39 Sample = 32.17 Projected = 39
7) Base Case with Stage I probability increased to 3%	Type A Cargo Carrier takes out some of it's A/C:	Population = 39 Sample = 26.1 Projected = 30.9
8) Base Case with Stage I probability increased to 10%	Type A Cargo Carrier takes out some of it's A/C	Population = 39 Sample = 21.4 Projected = 28.2
9) Team Points Cannot be Bought or Sold	Charter operators may reduce their CRAF commitments	Population = 39 Sample = 20.3 Projected = 22.6
10) Elimination of the Domestic and International Cargo Contracts	Type A Cargo Carrier exits CRAF	Population = 39 Sample = 16.5 Projected = 23.3
11) 50% Reduction of the Domestic and International Cargo Contracts	Type A Cargo Carrier commits 30% of its fleet, the rest commits 100%	Population = 39 Sample = 21.4 Projected = 28.2
12) Effects on Integrators and Scheduled Carriers if they do not Receive Commission Payments	Type A Cargo Carrier reduces its participation in CRAF	Population = 39 Sample = 21.4 Projected = 28.2
13) Expansion Buy Increased to $700 Million	All Carriers in CRAF	Population = 39 Sample = 32.17 Projected = 39
14) Fixed Buy Reduced to $5 Million	Type A Cargo Carrier decreases its commitment, Charter operators may park some of their A/C	Population = 39 Sample = 18.3-25.3 Projected = 22.4-32.4
15) Elimination of AMC Peacetime Buy and an Increase in the Probability of Stage I Call Up to 6%	Type A Cargo Carrier commits 30% of its fleet; Charter operators may park all of their A/C	Population = 39 Sample = 9.8 Projected = 11.4
16) Elimination of AMC Peacetime Buy and a Decrease in the Probability of Stage I and Stage II Call Up to 1%	Charter operators may park all of their A/C	Population = 39 Sample = 20.52 Projected = 22.2

Note: Type A cargo carrier is FedEx.

5. Effect of Eliminating the Domestic and International Express Contracts

There are impacts on CRAF commitments if the express contracts are eliminated. Type A Cargo Carrier(s) represent a very large portion of the cargo commitment in CRAF and their participation is highly sensitive to the continued availability of the government's express contracts (both domestic and international). Total MTM/D would drop to from 39 to 23.3 if the express contract were eliminated. The affected IDA demand scenario is the High Case scenario with a requirement of 30 MTM/D.

6. Effect if the Express Contracts are 50 Percent of Current Levels

There are also important impacts if the express contracts are reduced by fifty percent. The total MTM's per day would decrease to 28.2.

7. Effect on Integrators and Scheduled Carriers if They Do Not Receive Commission Payments

The model suggests that Type A Carriers are sensitive to the receipt of commission payments. If commission payments are taken away, these carriers reduce their participation level in CRAF. Total MTM/D are reduced to 28.2.

8. Effect of an Increased Expansion Buy to $700 Million

In and of itself, an increase in the expansion buy does not result in an incremental increase in CRAF commitments. This suggests that carrier motivations to join CRAF are a function not only of the AMC buy but also of other incentives. These results are generally consistent with those in preceding sections, which identify the express contracts as being a more important determinant of certain carrier's participation.

9. Base Case But Assuming 15 Additional C-17 Aircraft Reduces the Fixed Buy to $5 Million

According to the IDA demand study, an additional 15 C-17 aircraft would displace $70 million in the annual AMC buy. In this scenario, it is assumed that the entire displacement is in the fixed buy. Charter operators may have to park aircraft, resulting in a reduction in MTM/D equal to as much as 10 MTM/D. Type A Carriers would decrease their commitment to CRAF and depending on the number of aircraft charter operators decide to park, the total MTM/D would range from 22.4 to 32.4. As noted in Section 4.12 below, a reduction in charter operator participation may increase the probabilities of call-ups, which can adversely affect CRAF.

10. Base Case Assuming 36 or More C-17 Aircraft and Zero AMC Peace Time Buying

If 36 or more C-17s were purchased, the average fixed and expansion buys would be eliminated. The impact of this on the CRAF program might be to significantly increase the probability of a Stage 1 call-up. Without access to any peacetime flying capacity, changes in what would otherwise be CRAF peacetime missions might trigger an early Stage 1 call-up. If the probability of the call-up were tripled to six percent, MTM's per day would fall to 22.32.

It should be noted that presence of additional C-17 aircraft might also reduce the probability of call-ups with beneficial effects for CRAF. If the probability of Stage 1 and Stage 2 call-ups decreased from 2 percent to 1 percent, the elimination of the peacetime

buy would only affect the charter operators (Charter operators would park all of their aircraft.).

Charter operators could decide to park all of their aircraft, decreasing the total MTM/D by 16.8 MTM/D. Type A cargo carriers would also decrease their commitments to the 30 percent level. The total MTM/D would decrease from 39 to 11.4 (if charters' park all of their aircraft).

11. Passenger Base Case Model

Like the cargo model, the passenger model utilizes a sample of airlines and their specific aircraft currently committed to CRAF. The percentage impact on the samples are then projected onto the population of passenger aircraft.

The key assumptions for the passenger base case are as follows[92]:

- AMC fixed buy = $160 million per year
- AMC expansion buy = $170 million per year
- The government city-pair contract amounts equal actual carrier awards 2000
- Carriers are paid 7.885 cents per seat mile and $4,000 per stop for AMC flying
- The one-way passenger rate is set at 180 percent of the round trip seat mile rate
- The one-way contingency passenger rate is set at 193 percent of the round trip passenger rate
- Passenger carriers must commit 30 percent of their long-range fleet to CRAF to be eligible for the city-pair contracts
- Carriers are assumed to earn a commercial (revenue) rate per passenger-mile reported in Form 41 for the year ended December, 2000 (the last full year of data before the events of 9/11)
- Direct operating costs (including ownership) are taken from Form 41 for year ended December 2000
- CRAF commitments are as reported for the year beginning October 2002.
- The probability of a Stage 1 call-up is two percent with the average duration of 270 days (CRAF program is approximately 50 years old with one call-up lasting 270 days)
- The probability of a Stage 2 call-up is also two percent with a 270 days duration, but only 50 percent of the Stage 2 commitment called (this also is based on the Gulf War experience)
- The probability of a Stage 3 call-up is 0.1 percent with an average duration of 60 days, but with 100 percent of the CRAF fleet called.

[92] The data on the one-way fixed and expansion passenger rates are found in Air Mobility Command's Final Uniform rates and Rules for International Service, Fiscal Year 2002.

The passenger model has been calibrated to account for changes in CRAF commitment levels, depending on the state of economy. For each of the incentive scenarios described below, there are two sets of outputs. The first output describes the commitment levels as they would be if Type A passenger carriers earned a commercial (revenue) rate per passenger-mile reported in Form 41 for the year ended December, 2000. This is a robust economy assumption. The second output for each incentive scenario degrades commercial rates by 10 percent in order to account for a decrease in revenues during the downturns in the economy.

Table 13 summarizes sensitivity runs of the passenger incentives model, which are discussed below. It should be noted that the model base case shows significantly lower participation levels (in both good and bad times) than is actually the case. This suggests that at average AMC peacetime buy levels, the primary reason to join CRAF is to be eligible for the city-pair program which requires 30 percent of a carrier's long-range fleet be pledged to CRAF.

Table 13. Model Outputs for Passenger Carriers

Scenarios	Projected Participation (MPM/D) in Robust Economy	Projected Participation (MPM/D) in an Economic Downturn
Base Case	68	106.3
Expansion Buy Increased to $1.1 Billion	165	196
Probability of Stage I Call-Up is 10%	68	68
Elimination of Cargo Peace Time Buy	68	68
Expansion Buy of $1.1 Billion with elimination of Cargo Peacetime Buy	133	196
Base Case Assuming that a Substantial Carrier Parks its B747-400 Aircraft	62.2	100.3
Base Case Assuming that a Substantial Carrier Exits the Program	53.1	91.2
GSA City Pair Contract is Zero	8-14.6	73.5
GSA City Pair Contracts Reduced by 50%	68	106.3

12. AMC Passenger Expansion Build Up Equal to $1.1 Billion

A substantial increase in the passenger expansion buy significantly alters carriers' commitments to CRAF. In a robust economy, CRAF commitments increase from 68 to 165 MPM/D. In an economic downturn, carriers' MPM/D commitments to CRAF increase from 106.3 to 196. Both sets of outputs in this scenario would supply enough MPM/D to fulfill all three wartime planning scenarios (refer to Table 11B).

13. Base Case with a Stage 1 Probability of Ten Percent

If the probability of a Stage 1 call-up increases to 10 percent, the available MPM/D in a robust economy would stay at the Base Case level of 68 MPM/D. However, during an economic downturn, an increase in probability of Stage 1 call-up would cause a decrease in CRAF commitment level. Total MPM/D would decrease from 106.3 in Base Case to the same 68 MPM/D. The outputs under the two different assumptions about economy would be equal and not enough to fulfill DoD's requirements.

14. Base Case Assuming Cargo Peacetime Buy is Eliminated

If the cargo peacetime buy were reduced to zero, scheduled passenger carriers would not receive commission payments for cargo charter operators. Under these circumstances, CRAF participation levels would stay unchanged in a robust economy but would decrease from 106.3 MPM/D to 68 MPM/D assuming an economic downturn. This is not enough to fulfill the demand requirements under any of the three cases specified in Table 11.

15. Base Case Assuming Cargo Peacetime Buy is Eliminated but Passenger Expansion Buy is Increased to $1.1 Billion

An increase in the passenger expansion buy to $1.1 billion combined with elimination of cargo peacetime buy would result in 133 MPM/D during a robust economy and 196 MPM/D during an economic slowdown. In both cases, the produced MPM/D would be enough to fulfill DoD's requirements under all three wartime planning scenarios summarized in Table 11.

16. Base Case Assuming a Substantial CRAF Carrier Parks All of Its B747-400 Aircraft

One CRAF airline recently announced that it was parking 24 of its B747 aircraft. There is a chance that the carrier will further consolidate its operations and eliminate the B747 from its fleet. If this were to be the case, the Stage 3 productivity of the CRAF passenger fleet would equal 62.2 MPM/D in a robust economy and 100.3 MPM/D during an economic downturn. While 62.2 MPM/D does not fulfill the IDA requirements under any of the three scenarios, 100.3 MPM/D fails to account for only the High Case demand scenario.

17. A Substantial CRAF Carrier Exits the CRAF Program

There is a chance that one operator of numerous CRAF wide-bodies will be unable to restructure or reorganize itself and could enter Chapter 7 proceedings. In such a case, a significant portion of its fleet would be grounded and there is no assurance that such aircraft would be taken up by US carriers. Table 5 shows that only the Low Case demand scenario requirements would be supplied and only during an economic downturn.

18. Base Case Assuming GSA City-Pair Contract is Zero

The passenger airlines are extremely sensitive to the existence of the GSA city-pair contract. If the city-pair contract were eliminated, the daily CRAF production would be between 8 and 14.6 MPM/D during a robust economy and 73.5 MPM/D during economic downturns. Either outcome is far less than all-demand-side scenario requirements.

The carriers' sensitivity to the GSA contract is important because there is neither a direct link between CRAF and GSA awards nor are government passenger contracts enforced as strictly as corporate travel contracts (i.e., some of the government traffic leaks to competitors who publish matching fares in certain city-pair markets). In the base case, we assume that carriers realize 62 percent of their GSA 2000 contract awards.

Appendix D

PROJECTED DEMAND FOR CRAF

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The Civil Reserve Airlift Fleet (CRAF) program continues to provide the basis for ensuring DoD's access to commercial airlift support during contingencies or war. The program also provides the basis for meeting many of DoD's routine and unplanned peacetime airlift needs. Recent events, however, suggest the need to take a fresh look at CRAF and the prospective ability of the airline industry to meet future military requirements and civil sector needs through 2010.

This appendix describes our approach for estimating DoD and non-DoD airlift requirements though 2010. After providing some brief background material to provide a frame of reference, we highlight the primary objectives of our analyses and define key terms and concepts that are central to our work. We next discuss our approach for estimating DoD wartime and peacetime requirements for airlift and our estimates of these needs through 2010. We then address non-DoD needs in a similar fashion. We conclude by summarizing our major findings and highlighting some key factors that will influence the size of the CRAF requirement.

A. BACKGROUND

The CRAF Program was created in 1952 to expedite the availability of commercial airlift support for military operations. The policies governing the program were subsequently updated in National Security Decision Directive 280 of 1987. These policies, which have come to be known as the National Airlift Policy, remain in effect today. They essentially provide that the US military airlift capability should be sized to meet projected wartime needs and that commercial airline carriers should provide the airlift capability needed beyond that provided by organic military aircraft.

1. HISTORY OF US STRATEGIC MOBILITY PLANNING AND CRAF OPERATIONS

US Cold War era military planning was threat-driven and predominantly NATO-centric in focus. In support of projected operations, strategic mobility planners focused on deploying large numbers of forces and significant amounts of sustaining stocks to the European theater of operations. Although the sheer volume and magnitude of the effort required extensive use of sea lift and pre-positioned equipment sets, CRAF played a significant role in military planning, enabling the rapid movement of priority cargo and large numbers of military people to forward locations to link up with their pre-positioned equipment sets.

The post-Cold War planning focus shifted to regional contingency operations and the demands of supporting two nearly simultaneous major regional wars. The Persian Gulf War, the first major post-Cold War military operation, involved a lengthy buildup phase that saw the movement of significant numbers of personnel and bulk cargo via CRAF to forward sites in the Middle East. This operation also saw CRAF aircraft diverted from their planned destinations because of the threat of tactical ballistic missile strikes against allied air bases. The growing concern that some of these missiles might be carrying weapons of mass destruction (WMD) also impacted military operations and the use of CRAF.

DoD conducted several mobility requirements studies following the Persian Gulf War. The main purpose of these efforts was to address the Department's projected wartime mobility needs and to ensure that appropriate programs and mechanisms were put in place to meet the highest priority requirements.

The most recent comprehensive study, Mobility Requirements Study (MRS)–05, was released in January 2001. This study established DoD's projected mobility requirements for concurrently supporting two nearly simultaneous major regional wars and other high priority operational needs given DoD's projected 2005 force structure and program. These requirements, which were to be met by a mix of organic military and commercial airlift and sealift capacity, were subsequently reviewed and reaffirmed as reasonable planning objectives during the Quadrennial Defense Review (QDR) of 2001.

In addition to planning to use commercial aviation support in war, the Department relied upon commercial aviation to meet its peacetime passenger and cargo movement requirements throughout the decade of the '90s and the early 21st century. Policies and procedures governing how this government business was to be allocated among CRAF program participants and other commercial carriers were also implemented to ensure the availability of CRAF carriers during war.

The current CRAF program involves maintaining a fleet of commercial aircraft, including crews, en route infrastructure, fuel, maintenance, and ground support equipment that is capable of moving military forces and cargo within 24 – 48 hours after notification of a call up of aircraft. About 800 aircraft comprise the current CRAF program. When activated, these aircraft provide slightly more than 90 percent of DoD's troop-carrying needs, about 40 percent of its cargo carrying needs, and 100 percent of projected inter-theater aero-medical evacuation needs.

2. Looking Ahead

QDR 2001 emphasized the need to transform US military forces and to defend against possible attacks against the United States. In this regard, the current national military strategy envisions the need to project tailored military forces and support packages rapidly throughout the world on short notice to accomplish a broad range of missions. These missions include conducting humanitarian relief operations, as well as fighting two major regional combat operations against heavily armed foes that may employ tactical and long-range missiles equipped with conventional and even WMD warheads. Moreover, although the organic military airlift fleet today is large and will grow as a result of the acquisition of additional C-17 aircraft, the capacity provided by CRAF remains central to implementing the current strategy through 2005.

DoD's strategic planning focuses on transforming US military forces. In this regard, one of the goals of this effort is to field smaller, lighter, more lethal forces that can be deployed to distant locations in a matter of hours or days to swiftly defeat an opponent. This is in stark contrast to the long buildup that preceded the Persian Gulf War. This new emphasis, which is being reflected in DoD's emerging transformation plans and logistics concepts, and studies of advanced mobility concepts, will ultimately result in new force

structure designs and operational concepts. Importantly, it also will result in changes to the US global military posture. In this regard, "the US global military posture will be reoriented to:

> Develop a basing system that provides greater flexibility for US forces in critical areas of the world, placing emphasis on additional bases and stations beyond Western Europe and Northeast Asia.
>
> Provide temporary access to facilities in foreign countries that enable US forces to conduct training and exercises in the absence of permanent ranges and bases.
>
> Redistribute forces and equipment based on regional deterrence requirements.
>
> Provide sufficient mobility, including airlift, sealift, pre-positioning, basing infrastructure, alternative points of debarkation, and new logistical concepts of operations, and to conduct expeditionary operations in distant theaters against adversaries armed with weapons of mass destruction and other means to deny access to US forces."[93]

The foregoing notwithstanding, the US force of 2010 will probably still include a large proportion of today's heavier legacy forces and equipment. Consequently, airlift planning requirements in 2010 could involve a broader, more demanding range of possibilities and require a fleet of organic military aircraft and CRAF aircraft that can deliver large amounts of bulk, oversize, and outsize cargo and significant numbers of military personnel to forward employment sites. This fleet will also have to provide critical aero-medical evacuation support to our deployed forces.

Finally, it is important to note here that the Secretary of Defense recently directed a review of all operational plans with the goal of revising these plans to swiftly defeat foes utilizing fewer forces and less logistics support. This review will probably result in less passengers and cargo being deployed into the combat zone over the course of the conflict. But air delivery in the early days still is likely to be required and could logically be expected to reach the physical capacity limits of destination airfields, given the emphasis placed on swift defeat of the enemy. Moreover, the threat may dictate the need to rely on intermediate staging bases located some distance from the combat zone; this would necessitate transloading passengers and cargo from CRAF to organic military aircraft for movement into the combat zone.

B. OBJECTIVES

Our primary objective is to project DoD's potential requirement for CRAF through 2010. In developing our estimates, we considered the following factors:

> The acquisition of different numbers of C-17 aircraft. Specifically, we considered total procurement programs of 120, 150, 180, and 240 aircraft.[94]

[93] Quadrennial Defense Review Report, September 30, 2001, p.26.

[94] MRS–05 was based on a procurement of 120 C-17s. Although 180 aircraft have been approved for procurement, only 150 aircraft were funded in the proposed program being developed for DoD senior

Experience regarding airlift planning factors.

Projected transformation initiatives that may be implemented by 2010.

Emerging logistics practices, such as increased use of time-definite delivery via air, and integrated multi-modal operations.

New support concepts, such as the increased use of multiple intermediate staging bases (ISBs) to support a crisis response or wartime operation.

We also are interested in gaining insights on the potential impact CRAF activation might have on DoD support base operations and the broader US economy. In this regard, we discuss emerging trends in DoD and commercial logistics practices, and projections of civil sector demand for passenger and cargo movement.

C. KEY TERMS AND CONCEPTS

Four terms and concepts are particularly important to our analyses: capacity, capability, capabilities-based planning, and intermediate staging bases (ISBs). The terms "capacity" and "capability" are routinely used throughout MRS–05 and other military mobility requirements studies. The terms "capabilities-based planning," which recently has been adopted by Secretary of Defense (SECDEF) Rumsfeld, and "intermediate staging base" are relatively new and are particularly relevant to our approach for looking into the future. These terms, as used in this work, are defined as follows:

Capacity. The term "capacity" describes the notional ability of an airlift fleet to move cargo and passengers. For the former, the metric used to describe capacity is "millions of ton miles per day" (MTM/D). For the latter, the metric is "millions of passenger miles per day" (MPM/D). These commonly used measures provide a convenient way of comparing different aircraft fleets. Capacity is computed by a formula that incorporates the physical characteristics of the aircraft, the number of crews, and amount of sustaining support available. It does not include scenario-specific factors that generally limit the amount of cargo or number of passengers moved, and result in a number that is less than the computed capacity.

Capability. The term "capability" describes the actual or estimated ability to conduct a particular operation or accomplish a mission. It takes into account a number of scenario-specific variables to include the density and type of cargo to be moved, enroute infrastructure, and the number and size of airfields used for onload and offload operations. The term, which typically is linked to a risk assessment (e.g., we can accomplish the mission with a moderate level of risk), usually involves a comprehensive home-station-to-battlefield assessment of unit deployment and movement requirements, transportation modes and nodes, and potential threats (e.g., the use of tactical ballistic missiles, WMD, etc).

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leader consideration at the time of this writing. A program of 240 aircraft is addressed because it most closely approximates our understanding of the goal of the Commander, U.S. Transportation Command.

Capabilities-Based Planning. The term "capabilities-based planning" refers to Secretary Rumsfeld's concept that focuses on identifying the types of military capabilities that will be required to swiftly defeat a determined foe in different threat environments. We use the term to describe the approach we used to develop estimates of DoD's future wartime needs.

Intermediate Staging Base (ISB). We use this term to denote an area (i.e., a sea-based platform or land-based infrastructure) located out of immediate harm's way that can be used to support a planned or unplanned crisis response or wartime operation. The location of an ISB may vary considerably, depending upon access rights, agreements, etc. In this regard, an ISB may be located several thousand nautical miles from CONUS and several hundred nautical miles from the forces engaged in actual combat.

D. ESTIMATING DOD WARTIME REQUIREMENTS

1. Overview of the MRS–05 Methodology, and the IDA Approach

The MRS–05 study essentially determined the amount of airlift that had to be applied to meet the needs of military forces engaged in a variety of different operations; the objective was to ensure that each operation could be accomplished militarily with an acceptable level of risk, given the projected organic military fleet and forces in the 2005 defense program. The 2005 program in this instance included a projected C-17 buy of 120 aircraft.95

Although MRS – 05 used the terms "capacity" and "capability," it primarily focused on assessing DoD's projected capability to successfully prosecute two nearly simultaneous major regional contingencies, while concurrently accomplishing other high-priority airlift requirements. The assessment process employed in making these "capability" determinations spanned a period of about 24 months and involved extensive use of computer models and analytical talent. Significantly, the capability determinations made during MRS–05 were also translated into "capacity" metrics that highlighted the estimated total requirement for airlift in MTM/D and how much of that total requirement was to be provided by organic military and CRAF aircraft.

Resource constraints, particularly time and funding, dictate that we estimate the Department's projected airlift requirements in capacity terms. Where appropriate, however, we note and discuss some factors that could impact the "capability" to conduct an operation or accomplish a mission. The specific approach and techniques we employ to develop our estimates are explained in subsequent discussion.

In brief, we seek to develop "capabilities-based" capacity estimates of the Department's potential requirements for organic military and CRAF airlift through 2010. In this regard, our goal is to develop macro-estimates of the airlift capacity that will likely be required to implement the national military strategy in 2010 with an acceptable level of risk, given different organic military and CRAF fleets and support concepts.

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[95] The cargo movement requirement in short tons considered in MRS–05 was about 25 percent greater than that used in the previous MRS.

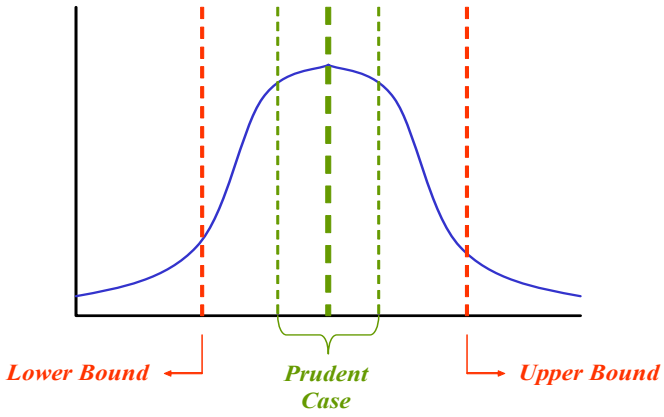
Maintaining the linkage between capacity and capability established in MRS–05 is important to that end because it provides some basis for making informed judgments as to the potential impact of changing force structures and employment concepts and distribution-support concepts.

The specific approach and techniques we employ to estimate DoD's projected requirements for cargo, passenger, and aero-medical evacuation support in war are described in subsequent paragraphs.

2. Cargo Requirements

The results of MRS–05 establish a baseline set of conditions and a corresponding linkage between "capacity" and "capability" for cargo movement requirements. Using this baseline as a point of departure, we sought to bound the space of greatest potential interest from a strategic planning perspective. As shown in Figure 1, our intent was to define a prudent planning case and an upper and a lower bound planning case for CRAF cargo capacity, as opposed to a point estimate or a narrow range of estimates.

Figure 1. Defining a Range of Cargo Planning Estimates



a. Base Case

To accomplish the foregoing, we develop a Baseline Case by employing the following approach:

We first examine the total cargo capacity that MRS–05 highlighted was essential to prosecuting two major regional wars and concurrently supporting other approved high priority missions. That capacity, shown in Table 1, is 54.5 MTM/D. Of this amount, 6.2 MTM/D is for intra-theater and special mission requirements and is to be provided by organic military aircraft (primarily C-17s and C-130 aircraft). The remaining 48.3 MTM/D is for inter-theater requirements. Of this amount, 27.8 MTM/D is to be provided by organic military aircraft and 20.5 MTM/D is to be provided by CRAF.

Table 1. MRS—05 Baseline Cargo Requirements

MTM/D	
	27.8 Organic military
	20.5 CRAF
	48.3 Inter-theater
	6.2 Intra-theater + Special Missions
	54.5 Total

Our analysis focuses on the 48.3 MTM/D inter-theater cargo requirement. It assumes the remaining requirement for 6.2 MTM/D will be satisfied by using available C-17 aircraft.

MRS–05 limited CRAF to carrying bulk cargo only and capped the use of available CRAF capacity at 20.5 MTM/D because of concerns that going beyond this level might adversely impact the US economy. Recent analysis, however, provides convincing evidence that additional organic military capacity can be freed up by moving oversize cargo on CRAF aircraft.96 Information developed as a result of this study also supports the view that US military planners can reasonably plan on using more than 20.5 MTM/D in CRAF capacity, provided this capacity is available and can be accommodated by projected enroute infrastructure and onloading and offloading airfields without adversely impacting throughput. Therefore, we removed the restrictions placed on CRAF by the MRS–05 analysis.

Having established a baseline of 48.3 MTM/D in cargo requirements, we then employed a simple Excel-based spreadsheet to depict the potential impact of different fleets of C-17 aircraft (150, 180, and 240 aircraft) on organic military capacity.97 To maintain a clear, traceable linkage with the MRS–05 results, the total airlift capacity of 48.3 MTM/D identified in MRS–05 is treated as a given. We then:

- Determine the organic military capability associated with different C-17 fleets using the airlift planning factors employed in MRS–05;
- Subtract this amount from the 48.3 MTM/D requirement to determine how much CRAF capacity is required to meet the residual requirement.
- The results of applying this technique are highlighted in Table 2 and discussed below. To facilitate understanding and ensure traceability, we show the results to

[96] Recent work done by the Program Analysis and Evaluation Directorate, Office of the Secretary of Defense (OSD), provides convincing evidence that this is possible and practical up to a limit. That limit, which is classified, is not approached by our analysis.

[97] This spreadsheet was developed by IDA in support of previous DoD mobility requirements studies.

one decimal place.

- The second column shows the QDR affirmed base case-required inter-theater capacity of 48.3 MTM/D that is based on a fleet of 120 C-17s. Columns three, four, and five illustrate the impact of buying additional C-17s on organic military capacity using the MRS–05 military planning factors, assuming the 6.2 MTM/D requirement is satisfied by the available fleet of C-17 aircraft.

- The 240 aircraft program (column 3) results in the greatest organic military capacity and smallest demand for CRAF capacity.

- The 150 aircraft program (column 5) results in the smallest organic military capacity and the greatest demand for CRAF capacity.

- The 180 aircraft program (column 4) is the prudent planning estimate from our perspective from both an organic military and a CRAF capacity perspective.

Table 2. Impact of Procuring More C-17s on Organic Military and CRAF Capacity

		Planning for CRAF		
Planning Assumption	**QDR Base Case 120 C-17s**	**Lower Bound 240 C-17s**	**Prudent 180 C-17s**	**Upper Bound 150 C-17s**
Baseline: Impact of more C-17s using MRS-05 factors & C-17s to do 6.2 MTM/D of intra-theater/special missions	**27.8 Organic 20.5 CRAF 48.3 Total**	**35.0 Organic 13.3 CRAF 48.3 Total**	**28.3 Organic 20.0 CRAF 48.3 Total**	**25.0 Organic 23.2 CRAF 48.3 Total**
Intra-theater/special missions TOTAL Requirement	**NOT MET 54.5**	**6.2 Organic 54.5 Total**	**6.2 Organic 54.3 Total**	**6.2 Organic 54.5**

b. Excursions

Having established the foregoing baseline, we then examined the impact on organic military capacity of changing the military airlift planning factors used in MRS–05. In this regard, there is sufficient reason to believe that the factors used in MRS–05 are optimistic and may overestimate the capacity of organic military aircraft.98 Accordingly, after examining the impact of changing individual factors in isolation from each other, we then iteratively explored the impact of changing several factors in combination. For example, among other things we explored the impact of reducing the utilization rates for C-17s, C-

[98] For example, a RAND Project Air Force Study, *Finding the Right Mix of Military and Civil Airlift, Issues and Implications*, 1994, Executive Summary, p.15, concluded that "optimistic planning factors have caused airlift capability to be overestimated… . For the C-17, the Air Force's utilization goal of 15.65 hours per day contrasts with our estimate of 12.2 hours per day under ideal scheduling conditions." The Air Force subsequently reduced this goal to 15.15 hours per day, which is the number that was used in MRS–05. Moreover, the fact that MRS–05 essentially assumed near-perfect conditions with regard to scheduling, communications, and weather also supports the need to explore the ramifications on CRAF of more conservative projections of organic military capacity.

5As, and C-5Bs individually and collectively. We followed the same approach with regard to exploring the impact of employing different block speeds and numbers of military aircraft, and different utilization rates for CRAF aircraft. The purpose of these iterations was to gain insights on the potential sensitivity of the results to changes in these parameters and to establish a number of different but plausible results.

To expand upon our baseline case we also iteratively examined the potential impact of different support concepts and techniques to include the increased reliance on time-definite delivery and intermediate staging bases. These excursions were developed using MRS–05 planning factors and variations of these factors. As before, the purpose of these excursions and iterations was to gain insights on the potential sensitivity of the results to changes in input parameters and to establish a number of different but plausible results for different operational and support concepts.

The results of the foregoing approach are highlighted in simple form in Table 3. This table illustrates the prudent planning case and the lower and upper bound estimates of the CRAF capacity that may be required in each of the following three cases:

Case I – Conservative Military Planning Factors: This case encompasses the range of results we obtained by adopting increasingly conservative military aircraft planning factors individually and in various combinations for different aircraft fleets.

Case II – Case I + Greater Use of Time-Definite Delivery: This case builds upon Case I and encompasses the range of results we obtained by exploring the potential impact of time-definite delivery on military and CRAF aircraft capacity. In brief, we believe the use of this technique will likely result in some reduction in fleet effectiveness, primarily because time delivery constraints may require planes to be flown with less than full loads.

Case III – Case II + Greater Reliance on ISBs: This case builds upon the other two cases and seeks to capture the potential impact of placing greater reliance on ISBs. In brief, we believe this scenario would require an increase in overall capacity, mainly because of the need to trans-load passengers and cargo to organic military aircraft for further movement into the combat area.

Table 3. Bounding the Analysis

Planning Assumption	QDR Base Case 120 C-17s	*Planning for CRAF* Lower Bound 240 C-17s	Prudent 180 C-17s	Upper Bound 150 C-17s
Baseline: Impact of more C-17s using MRS-05 factors & C-17s to do 6.2 MTM/D of intra-theater/special missions	27.8 Organic 20.5 CRAF 48.3 Total	35.0 Organic 13.3 CRAF 48.3 Total	28.3 Organic 20.0 CRAF 48.3 Total	25.0 Organic 23.2 CRAF 48.3 Total
Case I: Conservative Military Factors (-20% reduction)		28.0 Organic 20.3 CRAF 48.3 Total	22.4 Organic 25.9 CRAF [1] 48.3 Total	20.0 Organic 28.3 CRAF [2] 48.3 Total
Case II: Case I + time-definite delivery (+15% increase in the total capacity required)		*55.5 Required* 28.0 Organic 27.5 CRAF [3] 55.5 Total	*55.5 Required* 22.4 Organic 33.1 CRAF [4] 55.5 Total	*55.5 Required* 20.0 Organic 35.5 CRAF [5] 55.5 Total
Case III: Case II + greater reliance on ISBs (+10% increase in total capacity required)		*61.0 Required* 28.0 Organic 33.0 CRAF [6] 61.0 Total	*61.0 Required* 22.4 Organic 38.6 CRAF [7] 61.0 Total	*61.0 Required* 20.0 Organic 41.0 CRAF [8] 61.0 Total

[1] 20% of this amount is for oversize cargo
[2] 27% of this amount is for oversize cargo
[3] 13% of this amount is for oversize cargo
[4] 28% of this amount is for oversize cargo
[5] 33% of this amount is for oversize cargo
[6] 21% of this amount is for oversize cargo
[7] 32% of this amount is for oversize cargo
[8] 36% of this amount is for oversize cargo

c. Conclusions

We used the results depicted in Table 3 and our professional judgment to develop a range of prudent strategic planning estimates for CRAF. In this regard, we determined the following:

A prudent wartime cargo planning estimate for CRAF is about 25 +/– 5 MTM/D.

The results of MRS–05 and other analyses suggest that airfield limitations will likely limit the ability to use CRAF and achieve the Case III upper bound estimate of 41.0 MTM/D. In recognition of this, we believe an upper-bound cargo planning estimate of about 35 MTM/D is appropriate for strategic planning purposes. This number is about midway between the 240 C-17 aircraft Case III lower bound estimate and 180 C-17 aircraft prudent case estimate. It also is midway between the prudent estimates calculated for Case II and Case III.

To hedge against uncertainty and avoid understating the potential need for CRAF in wartime, we believe a lower-bound cargo planning estimate of about 15 MTM/D is appropriate. This number is slightly more than the calculated lower bound estimate of the Baseline Case, which we derived using MRS–05 military planning factors.

3. Personnel Requirements

Although MRS–05 focuses on deploying military units and capabilities and does not explicitly address personnel deployments, it does establish a CRAF Stage III capacity requirement of 130 MPM/D. The need for this much CRAF passenger capacity in 2010 and beyond, however, is not likely for three reasons. First, the Secretary's direction to transform US military forces and swiftly defeat foes with fewer forces and less logistics support is likely to produce results. Second, the new warfighting and advanced mobility concepts that are being examined will also likely yield some beneficial results. Finally, the possibility remains that the US might have to place increased reliance on ISBs and not fly CRAF aircraft forward of these areas.

Although the impact of the foregoing, individually and collectively, has unfortunately not yet not been quantified, we believe it is reasonable to use the following lower estimates of 2010 requirements for strategic planning purposes.

- A prudent wartime passenger planning estimate for CRAF is about 100 +/– 10 MPM/D; this equates to a reduction in capacity of about 25 percent from MRS–05.
- A higher case wartime passenger planning estimate of about 120 MPM/D is appropriate to hedge against uncertainty and establish some buffer capacity in case ongoing initiatives do not bear fruit by 2010; and
- A lower case wartime passenger planning estimate of 80 MPM/D is appropriate in the event that ongoing initiatives are highly successful.

4. Aero-Medical Evacuation Requirements

The current CRAF aero-medical evacuation requirement is for 32-40 aircraft. This requirement is based on several factors, to include the projected casualties associated with the types of operations envisioned and estimated cycle times.

The Air Force currently is reviewing the aero-medical evacuation requirement for CRAF. Accordingly, it is prudent at this juncture to continue to plan for 32-40 aircraft for this purpose given the specialized nature and criticality of this capability, the relatively small number of aircraft involved, and the ongoing review, which will be completed in the near future.

E. ESTIMATING DOD PEACETIME REQUIREMENTS

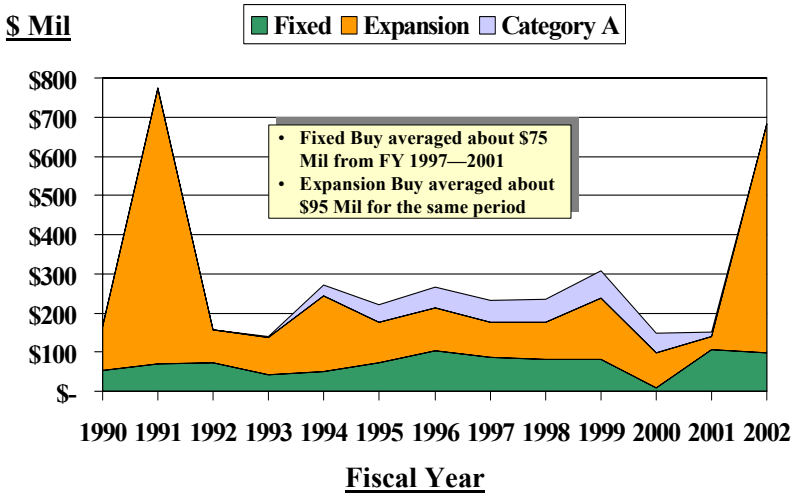
Estimating DoD's projected peacetime airlift augmentation needs is a challenging endeavor, primarily because numerous changes are under way within and among major logistics entities and these changes have greatly complicated data aggregation and projections. Accordingly, we first seek to construct a composite picture of what might transpire by reviewing the planning highlights and objectives of several major logistics and transportation planning entities, including the Office of the Deputy Under Secretary of Defense for Logistics and Materiel Readiness, the Defense Logistics Agency, the US

Transportation Command, and the Air Mobility Command of the United States Air Force. To gain additional insights, we have also review available time-series information depicting the dollar value of peacetime airlift workloads from 1990 - 2002.

1. Major Trends and Insights

CRAF-linked cargo revenues for the period Fiscal Year 1990-2002, depicted in Figure 2, fluctuated significantly. These fluctuations primarily are attributable to increased expansion buys of cargo airlift associated with supporting the Persian Gulf War and the most recent war in Afghanistan.

The period FY 1997-2001 is more representative of the average requirement with regard to cargo airlift augmentation needs. The fixed and expansion buys averaged about $75 million and 95 million per year, respectively, in this period.[99]



Source: Data provided by HQ AMC Contracting Office, November 13, 2002

Figure 2. CRAF-Linked Cargo Revenues, FY 1990—2002

The logistics community implemented numerous initiatives designed to improve responsiveness and reduce the cost of logistics operations throughout the last 10 years. These initiatives included increased use of premium transportation and direct vendor delivery techniques to reduce on-hand inventories and improve logistics system effectiveness. Although the resources devoted to direct vendor delivery and other such programs are not readily available,[100] all accounts indicate that these programs grew steadily throughout the period and enabled significant reductions in customer wait time,

[99] The term "fixed" refers to the projected movement requirements for the next period that can be forecast in advance. The term "expansion" refers to the requirements that occur during a period and were not included in the fixed program forecast.

[100] The major reason for this is because the management information system does not contain the appropriate data.

order and ship times, and on-hand inventories.

The importance of air transportation in DoD's internal distribution network today is illustrated by DLA's FY 02 summary transportation data, depicted in Table 4. As the data illustrate, air transportation accounted for a significant portion of the total transportation costs incurred by DLA in FY 02 as well as an overwhelming percentage of the total overseas shipments made by DLA. In this regard:

- 72 percent of DLA's total transportation charges of $608.7 million and 84 percent of its overseas charges (OCONUS) of $402.1 million were attributable to air transportation.
- 56 percent of DLA's 9.1 million worldwide shipments and 97 percent of its overseas shipments were made by air; the former equates to almost 4 million shipments and the latter amounts to slightly more than 1 million shipments.

Table 4. Defense Logistics Agency Summary Transportation Data, FY 02

Mode	Charges	Weight (lbs)	Shipments
Air Freight	$54,498,852	62,199,761	109,374
Air Parcel Post	$515,934	328,906	185,552
Air Small Package	$47,815,621	42,059,885	3,676,197
Air Subtotal	**$102,830,407**	**104,588,552**	**3,971,123**
Rail	$2,258,641	56,954,412	529
Surface Small Package	$12,512,679	30,238,349	3,603,543
Surface Parcel Post	$903,609	801,104	124,938
Truckload	$38,356,127	482,391,808	37,918
CONUS SUBTOTAL:	**$206,631,558**	**990,167,736**	**7,964,376**
Commrl Direct OCONUS	$3,781,170	1,345,665	2,185
WWX	$29,669,075	6,619,748	723,278
AMC MILALOC	$251,948,820	119,798,627	377,958
Air Subtotal	**$337,996,495**	**158,573,500**	**1,109,424**
Overocean	$64,085,155	355,810,859	35,564
OCONUS SUBTOTAL:	**$402,081,650**	**514,384,359**	**1,144,988**
TOTAL:	**$608,713,208**	**1,504,552,095**	**9,109,364**

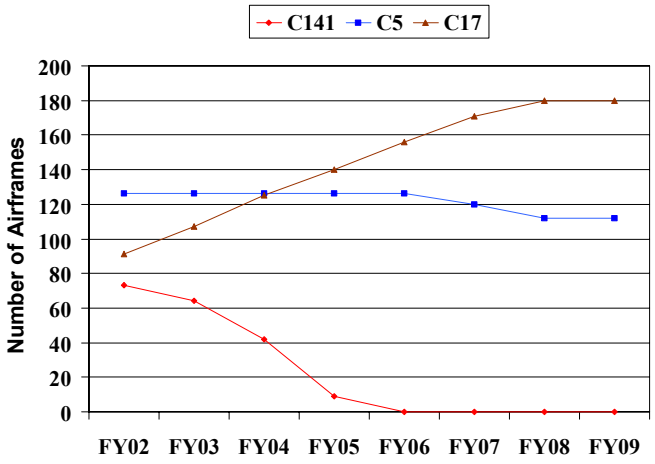
Discussions with representatives from the Office of the Deputy Undersecretary of Defense for Logistics and Materiel Readiness confirm that DoD's future logistics enterprise will increasingly rely on air transportation. However, this does necessarily mean that these growing peacetime needs will continue to be met by commercial airline carriers. In this regard, DoD's peacetime requirement for commercial air transportation support could be greatly reduced as organic military capacity grows, if current policies on funding the military flying hour program continue.

2. Peacetime Cargo Augmentation Requirements and Revenues

DoD's fleet of organic military aircraft will change considerably throughout the remainder of this decade as a result of recent decisions and proposals. As depicted in Figure 3, the current proposal being considered by the Department includes:

- Procuring additional C-17s and having a total of 180 airframes on hand by FY 2008,
- Retiring C-141 aircraft by FY 2006, and
- Modernizing and reducing slightly the total number of C-5 airframes on-hand in FY 2008 and beyond.

Figure 3. Projected Number of Selected Organic Aircraft by Type



Source: HQ AMC Briefing, 30 October 2002

As depicted in Figure 4, current plans provide for increasing the C-17 flying hour program as more airframes and crews are integrated into the force. These plans essentially provide for 5 crews per airframe, but this number may be reduced as the program matures and experience is gained.

It is important to note that DoD policies regarding the flying hour program seek (1) to use such aircraft to accomplish meaningful missions whenever possible, and (2) to defray a portion of the flying hour program expenses of such aircraft by charging customers for the service they are provided.[101]

[101] The exact policies and procedures employed transcend the scope of this study. For our purposes, it is important to understand that the procedure involves users reimbursing the Transportation Capital Working Fund with appropriated monies for the services they are provided in peacetime.

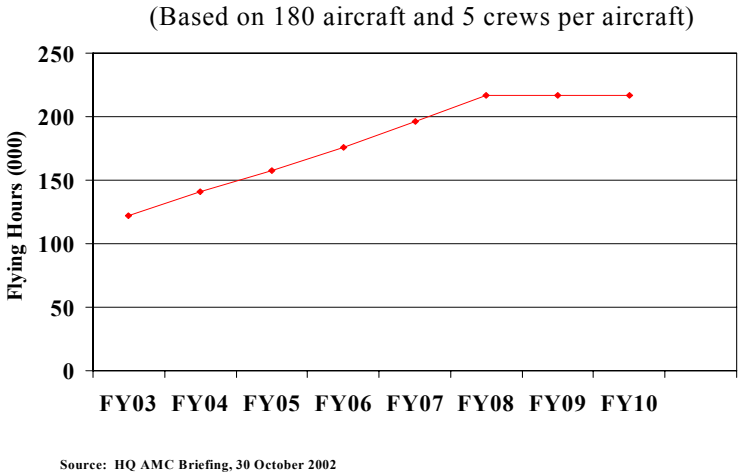


Figure 4. Projected C-17 Flying Hour Program

Figure 5 provides a hypothetical illustration of the potential impact of different C-17 fleets on DoD's peacetime requirement for commercial cargo augmentation. To provide a convenient point of reference, we show by a dotted line the average revenues from the fixed and expansion buys for FY 1997-2001, which totaled about $170 million per year. The simplifying assumptions we made to estimate the potential revenues that could be displaced by additional C-17 flying hours are shown and include a number of important judgments on our part.102 In general, this hypothetical example suggests that the 180 aircraft procurement and flying hour program could more than displace the average cargo revenues for the FY 1997-2001 period. The picture gets commensurately worse with larger fleets of C-17s and their associated flying hour programs.

3. Peacetime Passenger Augmentation Requirements and Revenues

CRAF-linked passenger revenues for the period FY 1990-2002, which are depicted in Figure 6, also fluctuated significantly. These fluctuations primarily are attributable to increased expansion buys of cargo airlift associated with supporting the Persian Gulf War and increases in both the fixed and expansion buys to support the most recent War in Afghanistan.

The period FY 1997-2001 is more representative of the average requirement with regard to passenger airlift augmentation needs. During this period, the fixed buy averaged about $160 million per year, while the expansion buy averaged about $170 million per year. The total of the two, $330 million per year, is almost twice the comparable cargo buy of $170 million per year for the same period. This is attributable to the fact that DoD relies on the commercial sector for virtually all of its passenger movement needs, and actually moves some of its own cargo on organic military aircraft.

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[102] Although one could use different numbers, we believe that the overall results obtained would be consistent with those depicted.

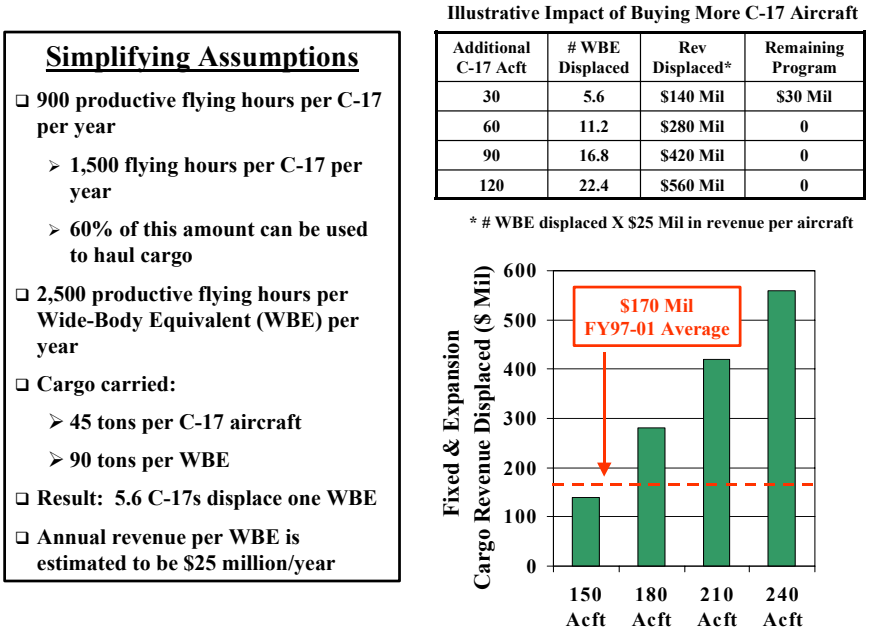
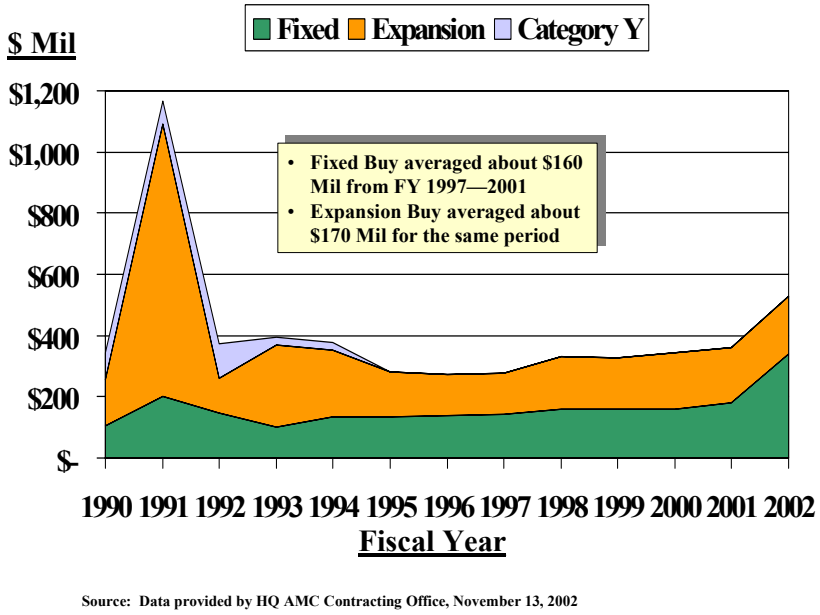


Figure 5. Hypothetical Impact of Additional C-17 Flying Hours on Commercial Cargo Revenues



Source: Data provided by HQ AMC Contracting Office, November 13, 2002

Figure 6. CRAF-Linked Passenger Revenues, FY 1990-2002

In addition to the revenues from DoD's fixed and expansion buys, commercial airlines enrolled in CRAF also can compete for the Airline City Pair Program, which is

administered by the General Services Administration (GSA).[103] As shown in Figure 7, this program averaged about $1.1 billion per year over the period FY1999-2002.

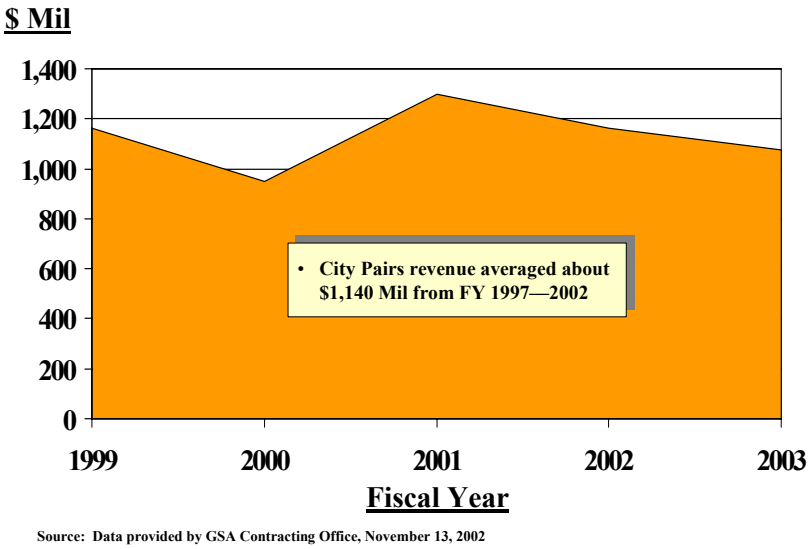


Figure 7. General Services Administration, Airline City Pair Program Revenue, FY1999--2002

4. Prudent CRAF-Linked Peacetime Planning Estimates

Based on the foregoing, we believe it prudent to adopt the following peacetime planning estimates for CRAF. Our estimates are stated in dollar terms in order to facilitate their use by the business case models we use to address supply-side considerations.

- DoD cargo revenues can decrease to zero during the period FY 2003-2010 if current DoD policies regarding the funding of flying hours are continued. However, to ensure all-important aspects of the problem are addressed, we believe it is prudent for the supply side analysis to explore the potential business model ramifications of various revenue levels between $170 million per year and zero.

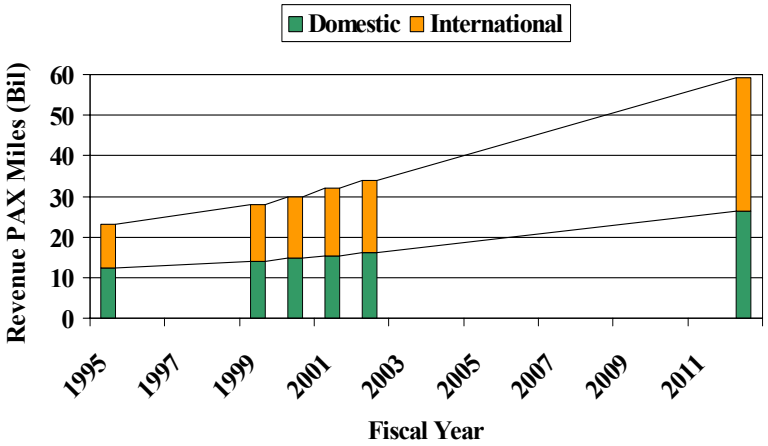
- DoD passenger revenues for FY 2002-2010 are likely to continue at the historical averages for FY 1997-2001, as follows:
  - Fixed Buy: $160 million per year
  - Expansion Buy: $170 million per year

- GSA City Pairs passenger revenues for FY 2003-2010 are likely to continue at the historical average for FY 1997-2002 of $1.1 billion per year.

F. ESTIMATING NON-DOD REQUIREMENTS

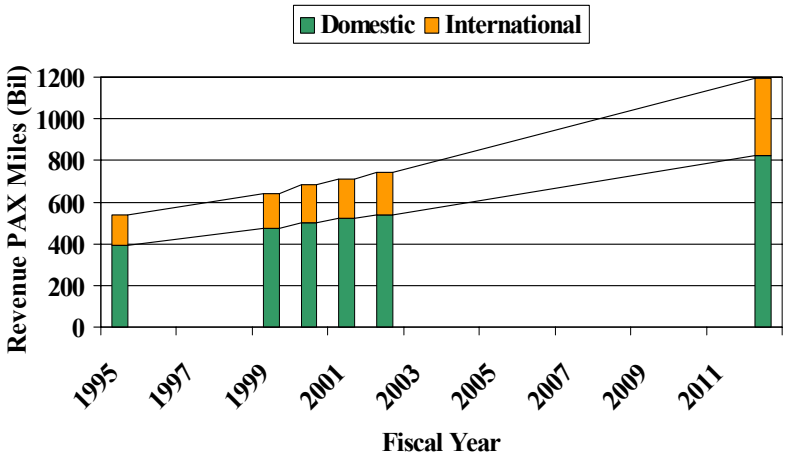
[103] The GSA-administered Airline City Pair Program, which applies to Government official travel, covers over 5,000 city pairs. The airfares offered under this program are lower than comparable commercial fares.

Despite the downturns associated with 9/11, reputable sources project that cargo and passenger demand will increase substantially through 2010 (Figures 8 and 9, respectively). In this regard, while the revised 2002 Federal Aviation Administration estimates shown in Figure 10 show a three-year slippage in reaching a billion passengers per year (from 2010 to 2013), they nonetheless show a substantial growth in passenger demand.



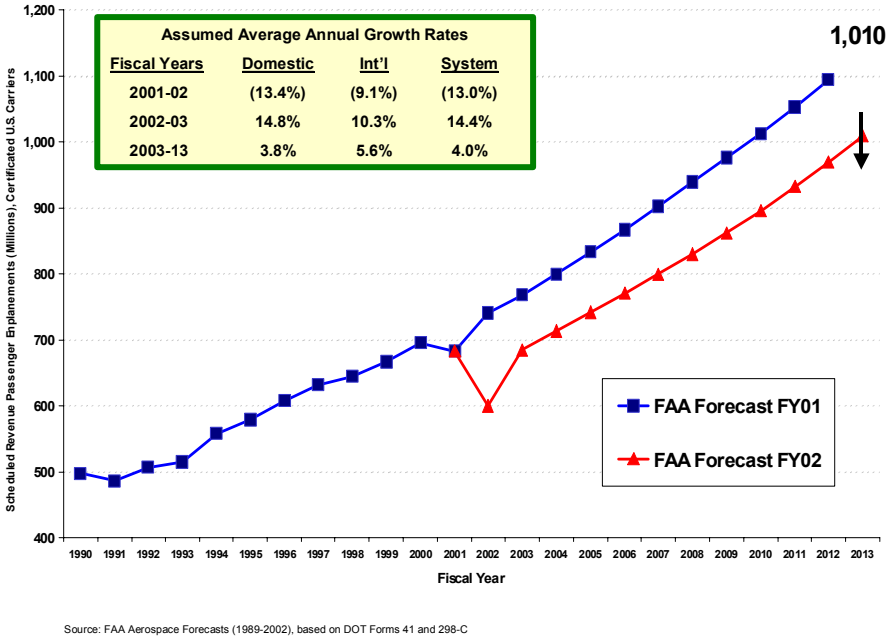
Source: The Aviation and Aerospace Almanac 2002

Figure 8. Cargo Demand, Large US Carriers, FY 1995—2012



Source: The Aviation and Aerospace Almanac 2002

Figure 9. Passenger Demand, Large US Carriers, FY 1995—2012



Source: FAA Aerospace Forecasts (1989-2002), based on DOT Forms 41 and 298-C

Figure 10. Federal Aviation Administration Passenger Demand Projections, FY 1990—2013

G. CONCLUDING OBSERVATIONS

1. Wartime Requirements

DoD's need for CRAF wartime augmentation for cargo and passenger movement and aero-medical evacuation support will likely remain significant through 2010 and beyond. In this regard, however, CRAF requirements will probably be driven by several key decisions. These include decisions on the:

- Number of C-17 aircraft that will be procured;
- Scope and pace of the DoD transformation program and the ability to implement new force structure designs and joint operational concepts;
- Scope and geographic location of pre-positioning programs;
- Need to use intermediate staging bases;
- Ability to move oversize cargo on CRAF; and the
- Ongoing aero-medical evacuation review.

It is important to note here that the threat of terrorism and potential use of weapons of mass destruction will likely alter how CRAF is employed in the future. In this regard, DoD may elect to fly CRAF aircraft to intermediate staging bases only and to transload cargo and passengers to military aircraft for movement to forward sites that are in closer proximity to harms way. This scenario, however, is problematic because military aircraft are not well suited to moving passengers and hence it could take considerably longer to

meet required delivery dates and throughput objectives. This scenario presents a potential major challenge and warrants priority attention.

Our assessment suggests that the prudent wartime planning basis for CRAF is as follows:

- **Cargo**: 25 +/– 5 MTM/D, with an upper bound of 35 MTM/D and a lower bound of 15 MTM/D.
- **Passenger**: 100 +/– 10 MPM/D, with an upper bound of 120 MPM/D and a lower bound of 80 MPM/D.
- **Aero-medical Evacuation**: 32-40 aircraft, pending the outcome of the ongoing review

2. DoD Peacetime Requirements

DoD's peacetime use of commercial cargo capacity is likely to increase considerably as a result of such ongoing initiatives as the Future Logistics Enterprise and direct vendor-to-consumer delivery. The impact of these initiatives is impossible to estimate with any reasonable degree of confidence because of differences in how data are defined, collected, and used within the logistics community.

Moreover, although it is reasonable to assume that the peacetime cargo movement workload will increase through 2010, it does not follow that this workload per se will be made available to commercial carriers involved in the CRAF program. The major reason for this is that DoD's current policy seeks to use organic military aircraft like the C-17 productively, and to defray a portion of the costs of the flying hour program for such aircraft by charging DoD customers for the services provided. Said differently, if current policies continue, the peacetime cargo revenues available for commercial cargo carriers participating in CRAF could be substantially reduced as the C-17 flying hour program increases. A major concern here is that significant reductions in peacetime cargo revenues could endanger or adversely impact the availability of wartime CRAF capacity.

Accordingly, the potential impact of various peacetime cargo revenue streams should be evaluated to determine if their respective impacts on the contemporary business model and how these changes might impact the availability of CRAF during a crisis or war. Concurrently, the feasibility and consequences of revising DoD's current funding policies governing flying hours for cargo aircraft should be reevaluated in light of the foregoing.

Finally, in the absence of compelling reasons to the contrary, we believe it prudent to assume that DoD and GSA City Pairs passenger revenues for the future will approximate those of the past. In this regard, DoD's fixed and expansion-buy passenger revenues will likely approximate $330 million per year, while the City Pairs program can be expected to average about $1.1 billion per year.

3. Non-DoD Requirements

Informed industry sources project that cargo demand for large US carriers will increase by almost 75 percent from FY 2002-2012. These same sources also project that passenger demand for large US carriers will increase by almost 75 percent for this same period. We believe that these estimates are reasonable and adopt them for our purposes.

Appendix E

ECONOMIC EFFECTS OF FULL CRAF STAGE III ACTIVATION

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This appendix examines whether a stage III activation of CRAF would have severe economic effects. The question arises from a concern expressed by some involved with CRAF that the economic effects of a stage III activation might be sufficiently adverse to warrant some modification of the program to avoid or lessen them.

The discussion presented here does not make any attempt to compare CRAF as it is currently structured with any alternatives. It is limited to the threshold problem of gauging the character and magnitude of the economic effects of a large-scale deployment of US forces that include stage III CRAF activation.

The CRAF program includes both passenger and cargo aircraft. This analysis does not examine the economic effects CRAF stage III activation might have through reductions in passenger services and increased fares; only air transportation of cargo is considered. This restriction on the scope of the analysis reflects a sense that the concerns expressed are mainly with the cargo markets, buttressed by a preliminary impression from the data examined that full CRAF III activation would have comparatively small effects on passenger markets.

POLICY CONTEXT

The nub of the concern seems to be that a full CRAF stage III activation might impose considerable economic costs on customers of the air cargo carriers who cannot readily replace air transportation with another transportation mode or adopt a work-around, such as acquiring inventories. These firms share in the generalized benefits of the CRAF, but, unlike the carriers, are not part of the program and, hence, receive no compensation for any costs that the CRAF might impose on them. There is also a concern that the effects on individual firms, and within particular markets and regions, would be large enough to induce such macro-economic effects as a noticeable increase in the rate of inflation, increased unemployment (in addition to that in industries directly affected), and deterioration in the balance of trade.

There is no presumption that the cost of military action will be borne equally by all citizens. There is a presumption that the US government will not assign significant costs, without compensation, to a particular group unless there is no reasonable alternative. For CRAF, the principal alternative appears to be ownership by the Air Force of a greater portion of the assets that would be required in the contingencies used to size the force. The policy issue, then, is whether the economic consequences of CRAF activation in the context of a large-scale deployment of US military forces are severe enough to warrant the costs of purchase, and operation in peacetime, of the assets the Air Force would need to meet the entire lift requirement.

1. Salient Features of the Air Transportation Industry

The air cargo transportation industry includes a variety of different services offered by several distinguishable types of firms to a wide range of customers throughout the world. The brief comments offered here are not intended to be even a general sketch of the industry. Rather, the purpose is only to point to the key features of the industry that underlie the discussion of economic effects offered below.

Tables 2 and 3 (which appear following the text of this appendix) convey a sense of how widespread use of air transportation has become in the US economy. The first of these (Table 2) lists the 35 commodity groups for which air accounted for at least 10 percent of total transport costs in 1997. These commodity groups span the complete range of products, from producers of durable equipment (machine tools, metal cutting types) to consumer goods (greenhouse and nursery products.) The data in Table 3 show the remarkably large extent that major goods imported and exported by US firms move by air.

There are two main groupings of suppliers of air cargo transportation services:

- Passenger airlines, which also carry freight in the holds of regularly scheduled passenger aircraft.
- All cargo operations.

There are three segments to the latter group of carriers. First, the largest and financially strongest all cargo operations are the "integrated carriers;" these are firms that provide "end-to-end service" – pickup, line haul transportation, and delivery. The integrated US all-cargo-carriers are FedEx, UPS, and DHL. Second, scheduled carriers, like the integrated carriers, provide service on fixed schedules but do not provide pickup or delivery. Those who ship by a scheduled carrier must directly provide their own pickup and delivery or employ freight forwarders to do these tasks. Third, charter (or contract) carriers also do not provide pickup or delivery and, as the label suggests, contract for particular jobs rather than offering their services to all comers on a fixed schedule. An industry expert contracted for this study offered as a very rough estimate that contract carriers currently employ about half of their capacity in carrying US government traffic, especially that controlled by the US Air Force Air Materiel Command (AMC). The remaining part of the contract carrier capacity appears to be, in effect, the industry's peak load capacity, and is not fully employed off peak.

The lines between the three types of all cargo carriers apparently are less sharp in practice than these comments may suggest. For example, in some market circumstances a charter carrier may offer scheduled service, while in other circumstances a scheduled or integrated carrier may provide charter service. Overall, it probably is more accurate to think of integrated, scheduled, and charter as more akin to types of services than segments of the industry with fixed memberships.

The cargo operations of passenger carriers and integrated and scheduled all-cargo-carriers are similar in that both fly on pre-established, published schedules. A key difference among them is when they fly. All cargo carriers schedule most of their flights for nighttime. Hence, given the capabilities of the aircraft they operate, for the typical city pair in the US they are able to receive shipments until an hour or so after the end of normal business hours and still deliver the shipment to its final destination early in the following day. With scattered exceptions, the cargo operations of passenger carriers cannot duplicate this "next day" service. Passenger carriers also generally do not provide pickup and delivery.

Integrated, scheduled, and passenger carriers offer several distinct types of service between various US city pairs at published rates on set schedules. The sorts of service provided by all cargo and especially integrated carriers and passenger carriers are not perfect substitutes for one another, however. As was noted above, compared to passenger carriers, the integrated carriers and the scheduled carriers offer faster service, and the integrated carriers also provide pickup and delivery service.

Air cargo transportation services on international market are provided by US and foreign all cargo carriers and by US and by foreign passenger carriers. There appears to be less differentiation between the services offered by all cargo and passenger carriers on international markets, mainly because all cargo operations have a smaller schedule advantage.

Prices on both domestic and international markets for air transportation appear to be competitively determined.

2. CRAF Stage III Aircraft Capacity Relative to Air Cargo Capacity

This section provides a brief description of the cargo capacity of aircraft committed to CRAF stage III relative to the total air cargo capacity of US carriers. The results are intended to be a benchmark useful in subsequent analysis, and it are not meant to imply that CRAF III activation would entail call-up of all of the aircraft committed to the program. The government could, and in practice probably would, do some or all of the following: provide more than the required 48 hours of warning of a CRAF III activation; call up the only a portion of the aircraft committed to CRAF; implement the CRAF stage III activation in a series of steps; and offer guidance on the likely duration of the activation.

The key factual question for this analysis is: By how much would full CRAF III activation reduce capacity committed to:

1. The services, especially express services, provided by the all cargo carriers to US city pairs; and
2. The market for international (typically transoceanic) air cargo transportation.

It is useful to frame the question in these terms to capture the willingness of buyers to substitute one transportation service for another and the ability of carriers to shift capacity between market segments.

The published data on air cargo traffic do not lend themselves to answering these questions. Moreover, CRAF commitments are stated in terms of specific aircraft, rather than (for example) in terms of ton-miles. To get around these problems, this analysis used data on the number of aircraft of various types operated by carriers and the cargo capacities of those aircraft. These capacity data were used to reduce the data on numbers of aircraft to “Wide Body Equivalent” (WBE) number of aircraft. In particular, the all-cargo variant of the Boeing 747 series 100 is used as the unit of account in the capacity

data presented in the table below. Thus, an all-cargo B 747 100 counts as 1 WBE. An aircraft with half the capacity of an all cargo B 747 100 counts as 0.5 WBE, and so on.

The capacity data for US and foreign carriers are presented below in Table 1.

Table 1. Air Cargo Capacity of U.S. and Foreign Carriers, 2002 in Wide Body Equivalent (WBE) Aircraft

U.S. Carriers					
All Cargo Carriers			Passenger Carriers		
Committed to CRAF Stage III		225	Committed to CRAF Stage III		76
Integrated	99				
Scheduled	36				
Charter	90				
Not Committed to CRAF		277	Not Committed to CRAF		*
CRAF Types	91		CRAF Types	81	
Other	186		Other	*	
Total, All Cargo		502	Total, Passenger		*

Foreign Carriers			
All Cargo Carriers		Passenger Carriers	
CRAF Aircraft Types	244	CRAF Aircraft Types	362
Other	145	Other	*
Total	389	Total	*

Source: GRA Inc. The capacity data are in terms of the all cargo variant of the Boeing 747 series 100 aircraft. The cargo capacities of various CRAF eligible passenger aircraft were referred to the cargo capacity of the B-747 400 passenger aircraft (27.3 tons), which was in turn referred to the cargo capacity of the cargo B-747-100 (109.5 tons).

* The estimates for these categories have not yet been completed, but a preliminary look at the data suggests that domestic passenger carriers operate passenger aircraft of types not eligible for CRAF with a cargo capacity of upwards of 200 WBE cargo aircraft. The figure for foreign passenger carriers apparently is comparable.

Full CRAF III activation calls up passenger aircraft with hull cargo capacity equal to 76 WBE cargo aircraft. This fact is ignored in what follows for two reasons. First, there currently are some 506 passenger aircraft stored in the US that could fairly quickly be returned to service. Second, cargo capacity utilization rates of passenger aircraft are low and it is unlikely that CRAF III activation would cause passenger service between any US city pairs to be abandoned. Hence, the actual decline in ability of passenger carriers to accept freight would be far less than the 76 WBE figure might suggest.

Manipulation of the data in this table to answer the question stated above employed the following assumptions:

- Half of the 90 WBE aircraft operated by charter carriers are employed in transporting US government cargo, and would continue in this employment under CRAF stage III activation.
- All of the 186 WBE aircraft operated by US all cargo carriers not of a type eligible for participation in CRAF are committed to provide service between US city pairs;
- Of the 271 WBE aircraft of types eligible for inclusion in CRAF committed by US all cargo carriers to commercial shippers, half are employed in the domestic market and half are employed in international air cargo transportation. [1]
- CRAF III withdrawals from service to private sector customers would also be half from domestic city pairs and half from international markets.

Note that the last of these embodies an assumption about the decision that the carriers would make on the complex problem of allocating their remaining capacity between domestic and international markets after a CRAF III activation. This assumption is simply a placeholder in lieu of analysis of the main factors that could be expected to drive the carriers decisions.

The first of the assumptions listed implies that the US all cargo carriers provide about 457 WBE aircraft to commercial shippers. Application of the remaining three assumptions leads to the following:

Estimated US all cargo capacity c 2002:

	Total	Committed to CRAF III
Employed in domestic markets	322 WBE	90 WBE
Employed in international markets	135 WBE	90 WBE

To derive these figures, note (in Table 1) that US all cargo carriers have 186 WBE aircraft of types not eligible for inclusion in CRAF; these are assumed to serve the domestic market. They also have an estimated 271 WBE aircraft of types eligible for CRAF serving commercial customers. Half of this number, or 136 WBE aircraft, are assumed to serve the domestic market. Hence, the US all cargo carriers provide an estimated 322 WBE aircraft to service of US city pairs (186 + 136 = 322). The 135 WBE aircraft remaining (457 WBE less 322 WBE) are assumed to serve international markets. Finally, US all-cargo-carriers operate an estimated 180 WBE committed to CRAF stage III in providing service to commercial shippers; it is assumed that in a full CRAF III activation, 90 WBE would come from domestic markets and 90 WBE from international markets.

From the point of view of a business in the market for transportation between a pair of US locations, there are two main alternatives to the services provided by the all-cargo-carriers and, in particular, the integrated carriers. First, passenger carriers also transport a wide variety of different types of cargo. Second, some shippers can consider substituting

[1] Add to the 225 WBE aircraft committed to CRAF stage III the 91 WBE in CRAF aircraft types not committed to CRAF, and subtract half of the 90 WBE aircraft operated by charter carriers.

surface transportation for air. Neither is a perfect substitute, or even a very good substitute, for the sorts of services offered by the all-cargo-carriers. First, at least the integrated all-cargo-carriers can promise next day delivery, while passenger and surface ordinarily at best promise second day. Moreover, pickup and delivery ordinarily must be arranged by the shipper on passenger aircraft or by surface transportation. For these reasons, the appropriate base for computing the reduction of supply to the domestic market from CRAF III activation is the 322 WBE aircraft provided by the all-cargo-carriers. On this basis, and given the assumptions noted above, full activation of CRAF III c 2002 would reduce the supply of the sorts of air transport services the all cargo carriers provide between US city pairs by about 30 percent.

US all cargo carriers face strong competition in international markets from foreign all cargo carriers. Furthermore, in the international markets, the cargo services provided by passenger carriers (US and foreign) seem likely to be closer substitutes for those provided by all cargo carriers, since with few exceptions the all cargo operations do not have so strong an intrinsic schedule advantage. Hence, the relevant base is the total international (that is, long-haul) market. All US carriers (all cargo plus passenger) currently have about 30 percent of that market. Given the assumptions listed above, full CRAF III activation would reduce the aircraft that US carriers devote to that market by about two-thirds, to 45 WBE from 135 WBE. The data required by a parallel computation for the cargo transported internationally by US passenger carriers, which have aircraft, committed to CRAF stage III were not available at the time this draft was completed. As a placeholder, it was assumed that the international cargo volume of these passenger carriers also would decline by two-thirds if there were a full CRAF stage III activation. This is almost certainly a substantial overstatement of what would actually occur, as US passenger carriers seem to be proportionally less committed to CRAF stage III than US all-cargo-carriers. Granted the assumption, however, the decline in cargo capacity on international routes would be roughly 20 percent of the total. (This assumes, which seems likely, that the cargo load factors for US all cargo and passenger operations are comparable to those of their foreign counterparts.)

In summary, subject to the uncertainties brought in with all of the assumptions made, full CRAF III activation would reduce by about 30 percent the supply of the services provided by all cargo carriers between US city pairs, and by at most about 20 percent the capacity to provide international air cargo service to commercial shippers.

3. Direct Economic Effects

The direct economic effects of CRAF III activation are understood here to be those on (i) the prices of air cargo transportation services; and (ii) the transportation costs shippers incur, and the consequent effects on the prices of the goods and services they produce and on the number of people they employ. The macroeconomic effects of CRAF III activation, discussed in the following section, are those on such aggregate economic measures as Gross Domestic Product (GDP), the unemployment rate, the inflation rate, and the balance of trade.

The formula below provides some help in gauging by how greatly air transport services prices would increase after a large-scale deployment of US forces and an associated activation of CRAF stage III:

$$\% \text{ change in price} \cong -(e_d - e_s)^{-1} \% \text{ change in supply},$$

where e_d and e_s are, respectively, the elasticity of demand and the elasticity of supply.

The formula is extracted from a simple static theoretical model of a purely competitive market (see Attachment 1 for the derivation). This model is only a gross representation of price formation in the air cargo services market. Moreover, the application of the formula requires several judgments on complicated matters of fact. For both of these reasons, the results obtained should be regarded only as indicative.

This formula is applied separately to each of the two market segments identified above. They are discussed in parallel because many of same considerations apply.

a. Aircraft in Storage

Aircraft in storage provide a ready, near-term source of additional capacity. As of late 2002, US carriers had approximately 41 WBE cargo aircraft in storage. Other US firms, primarily financial institutions, had approximately an additional 23 WBE aircraft in storage.[2] An industry expert consulted for this study indicated that an aircraft in storage typically could be returned to service in no more than 5 days. As noted above, a full activation of CRAF III would employ 180 WBE aircraft that had been engaged in providing air transport to commercial customers to transportation of military cargo. If all of the cargo aircraft currently in storage in the US were returned to service, the net reduction of capacity to the civilian market segments served by the US all cargo carriers would be reduced to 116 WBE aircraft.

[2] Cargo aircraft stored outside the US are an additional possible source of added capacity, and one likely to be tapped as prices for the sorts of services provided by the all cargo carriers increase. Beyond these sources of additional capacity, on an horizon of a few months there are large numbers of passenger aircraft in storage that could be reconfigured as cargo aircraft, in many cases for a cost on the order of a few million dollars.

Aircraft in storage become an additional to capacity only if aircrews, especially pilots, are available. It seems reasonable to assume that they would be, but the assumption was not investigated as part of this study.

Whether stored aircraft would be returned to service in the event of a full CRAF stage III activation depends a great deal on the carrier's expectations on the duration of the activation. These in turn would depend heavily on what statements were made to the carriers and, more generally, the extent to which the government acted to facilitate return to service of stored aircraft. For that reason, and because of its quantitative importance, the return to service of stored aircraft is treated explicitly as an effect distinct from the other factors swept up in the elasticity of supply.

Returning all of the stored aircraft to service would offset about 37 percent of the aircraft capacity committed to CRAF stage III. Given the assumptions listed above, the reduction in capacity servicing domestic markets would be about 18 percent, rather than 30 percent, and the reduction in capacity committed to international routes would be about 13 percent, rather than 20 percent.

b. Elasticity of Supply

Apart from bringing stored aircraft back into service, in the short-run carriers can take such steps as operating aircraft more intensively, leasing additional aircraft, and, within legal limits, delaying depot maintenance. On some routes, the aircraft still operating post-CRAF stage III activation also would operate at higher load factors. These measures are unlikely to increase supply by very much, however. A reasonable value for the short-run elasticity of supply (not including return of stored aircraft to operation) is probably in the range 0 to 0.1. (As a point of reference, if the short-run elasticity of supply were 0.1, a ten percent increase in price would elicit an increase in supply by the US all-cargo-carriers of a little less than 2 WBE aircraft.)

c. Elasticities of Demand

A search uncovered no empirical studies published during the past decade of the elasticities of demands for various air cargo services. The values selected for use in the computation reflect some qualitative features of the air transportation markets and a general sense of the demand elasticities typically found in studies of demands for goods and services purchased by firms as inputs.

A wide range of businesses regularly use the domestic services of the US all cargo carriers. It seems to be generally agreed that many of these shippers place a high premium on guaranteed, rapid delivery of their shipments. These shippers presumably are not very sensitive to price changes in the short-run (particularly to the extent that they use highly reliable, rapid transportation by air which is built into location, inventory, and other operating decisions.) Other shippers are less dependent on rapid delivery, and, as prices for the services of the all-cargo-carriers rise, will seek alternatives which, although slower and perhaps less convenient, are cheaper. The main alternatives are the cargo services of passenger airlines and surface transportation. The differences involved for

many shippers are matters of degree – somewhat slower and somewhat less convenient – so it is not unreasonable to assume a significant responsiveness to price on the part of these shippers.

Substitution would not necessarily require shipping with a different carrier. One executive of an integrated carrier interviewed in connection with this study indicated that his company could, by slipping promised delivery times from 10:30 AM to 12:00 noon, replace about 85 percent of the capacity committed to a full CRAF stage III activation by using trucks for the line-haul portion of the shipment.

US carriers are commonly said to face highly competitive conditions in international markets. The dimensions of the competition seem to include features of the services offered, as well as price. It seems to be generally assumed, however, that price is a major consideration, which is easy to understand, as the choices in question are between air cargo transportation services offered by US carriers and similar services offered by foreign carriers.

The values assumed in the computations reported here were -0.5 for the short-run elasticity of demand for the services the all cargo carriers provide between US city pairs, and -1.5 for the short-run elasticity of demand for the international services of US carriers (all cargo and passenger.) The considerations that motivated these choices are qualitative, and far from conclusive. A thorough investigation of the topic might well yield substantially different numbers.

d. Net Effects on Price

The discussion to this point has identified assumptions for all of the values that enter into the formula given above for the increase in price associated with a full CRAF stage III activation.

Given the assumptions listed earlier, full CRAF stage III activation circa 2002 would reduce by about 30 percent the capacity that US all cargo carriers provide to domestic markets. Assuming a short-run demand elasticity of -0.5 and a short-run supply elasticity of 0, the formula given above implies that this reduction in supply would result in an increase of about 60 percent in the average price of the domestic services of US all cargo carriers. Assuming a return to service of all large cargo aircraft currently in storage in the US (split proportionately between domestic and international traffic), the reduction in supply is only 18 percent. Assuming again a short-run demand elasticity of -0.5 but a supply elasticity of 0.1, the associated increase of price is about 30 percent. Both this and the 60 percent figure for the "higher" case implicitly assume full utilization of the capacity of the charter carriers not committed to government traffic. This implies that both the "lower" 30 percent increase and the "higher" 60 percent figure should be interpreted as applying to peak demand periods.

The corresponding estimated increases in average prices for international traffic are lower. The "higher" estimate is a 13 percent increase in average price; this case assumes a reduction of supply to the international market as a whole from full CRAF III activation

of 20 percent, a short-run demand elasticity of -1.5, and a short-run supply elasticity of 0. The "lower" estimate is about 8 percent; this figures assumes the return to service of all cargo aircraft currently stored in the US; a short-run demand elasticity of -1.5, and a short-run supply elasticity of 0.1. As with the estimated domestic price increases, both of these figures should be understood as applying to peak periods. Two of the assumptions made tend to overstate these estimates. First, the assumptions made probably overstate the reduction of the cargo moved by US carriers (all cargo and passenger) on international markets that would follow from full CRAF stage III activation. Second, concerns about long-term loss of position in international markets might lead US all cargo carriers committed to CRAF stage III to favor international markets over domestic markets at the margin.

4. Macroeconomic Effects

A full CRAF stage III activation would not force shippers to do without transportation except perhaps in rare cases. The effects would be matters of slower delivery, less convenient services, and higher prices, and these presumably would persist for only a few months. Consequently, there is no reason to be concerned that CRAF III activation would have a marked effect on the overall unemployment rate in the economy or on Gross Domestic Product.

The share of international markets held by US carriers would be at least temporarily reduced by a full CRAF stage III activation. This is to say that more imports to the US and more US exports would move by foreign carriers. The additional revenues paid foreign carriers (rather than US carriers) in effect would be a negative entry in the US net balance of trade. This effect might be hard to discern, however, because the year-to-year fluctuation in the US trade deficit over the past decade has sometimes been as much as a factor of ten greater than the total revenues of domestic carriers (passenger and all cargo) from freight.

Satisfactory measurement of the effect of an increase in air cargo prices on economy-wide price measures of inflation would require the use of an inter-industry model, which goes beyond what could be done for this analysis. Some readily available data, however, are sufficient to indicate that the effect would be small. In 2000, about 0.8 percent of GDP originated in the sector labeled "transportation by air" by the Bureau of Economic Analysis (BEA) of the US Department of Commerce. This is the weight that the "transportation by air" sector has in the implicit GNP price deflator for 2000. The "transportation by air" sector includes both the passenger and freight operations of US carriers, and may also include the operations of freight forwarders associated with shipments of freight by air. The published BEA data do not identify what part of the GDP originating in "transportation by air" is attributable to freight. Other sources show that in 2000, only about 8 percent of the domestic revenues of US carriers came from transportation of freight (including mail). Using this figure as a crude guide,[3] only about 0.06 percent of GDP in 2000 arose from the freight portion of "transportation by air."

[3] The correct measure is value added, not revenue, and it would be necessary to ensure that freight forwarders receive the same treatment in numerator and denominator.

Even if this figure is in error by a factor of two or three, the point remains – cargo transportation by air is a small factor at the level of an economy-wide price index.

Hence, even the "higher" increase for average domestic all-cargo air transport services would have only a very small effect at the level of the economy as a whole. Furthermore, the cause of the increase would be readily discernable and it would be recognized as a unique event, whose are effects are very likely to be transitory.

CONCLUDING COMMENT

The estimates presented above rest on a scaffolding of uncertain assumptions, and for that reason must be regarded as more illustrative than definitive. It is also important to recognize that the economic effects discussed above have their roots in the increase in demand for shipments of cargo by air that would be generated by a large-scale deployment of US forces. The US Air Force does not currently have sufficient organic capacity to meet all of the demand in that circumstance. CRAF is a way of arranging in advance the capacity required to meet this increased demand, and if there were no CRAF, the increased demand would be met by some other means. Any alternative but ownership by the Air Force of sufficient capacity, which involves a large cost to procure and operate in peacetime those aircraft required mainly in a contingency, would also have effects on civilian markets for air cargo transportation. Consequently, the estimates of economic effects offered here should not be interpreted as implicit criticisms of CRAF.

Table 2. Air Transport Share of Purchased Transportation Services in 1997, Various U.S. Industries

Industry	Purchased Transport Services, 1997 ($ Millions) Air	Total Used	Air as Percent of Total Transport
Schiffli machine embroideries	$14	$14	100.0%
Typesetting	$57	$57	100.0%
Environmental controls	$75	$75	100.0%
Platemaking and related	$73	$73	100.0%
Nonferrous rolling and drawing,	$108	$108	100.0%
Calculating and accounting	$53	$53	100.0%
Carbon paper and inked ribbons	$17	$17	100.0%
Miscellaneous livestock	$281	$295	95.2%
Oil and gas field machinery	$516	$544	94.9%
Aircraft and missile engines	$544	$579	94.0%
Aircraft and missile	$604	$654	92.5%
Commercial fishing	$202	$220	91.8%
Machine tools, metal cutting types	$287	$317	90.3%
Envelopes	$64	$76	83.8%
Prepared fresh or frozen fish	$104	$133	78.5%
Greenhouse and nursery products	$1,648	$2,123	77.6%
Paper industries machinery	$86	$114	75.8%
Costume jewelry	$43	$57	75.6%
Fluid milk	$348	$474	73.4%
Printing trades machinery and	$76	$104	73.3%
Newspapers	$249	$347	71.8%
Canned and cured fish and	$51	$79	64.3%
Fasteners, buttons, needles,	$44	$72	60.7%
Blankbooks, looseleaf binders	$77	$132	57.9%
Scales and balances, except	$18	$31	56.1%
Conveyors and conveying	$88	$172	51.3%
Boot and shoe cut stock and	$14	$28	49.6%
Prerecorded records and tapes	$102	$221	46.2%
Commercial laundry equipment	$10	$24	41.4%
Periodicals	$345	$1,021	33.8%
Mechanical power transmission	$94	$317	29.6%
Signs and advertising	$139	$694	20.0%
Miscellaneous publishing	$220	$1,332	16.5%
Fruits	$265	$1,719	15.4%
Carburetors, pistons, rings,	$58	$563	10.3%

Source: Unpublished GRA Inc. analysis of U.S. Department of Commerce, Bureau of Economic Analysis 1997 Benchmark I-O accounts.

Table 3. Fifteen Commodities with the Largest Value of General Imports to the U.S. and General Exports from the U.S in 1997

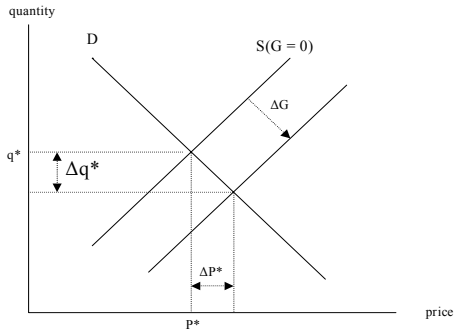
Commodity Code	($ Billion) Imports Commodity Description	Imports	Shipped by Air	Share by Air
8542	Electronic integrated circuits and microassemblies	33.1	29.4	88.7%
8471	Computers (automatic data process machines; magnetic reader, etc.)	45.0	27.4	60.8%
8473	Parts and accessories for office machinery and computers	23.8	16.6	69.5%
9801	Exports of repaired imports; imports of returned exports	20.6	10.9	52.8%
7102	Diamonds	7.6	7.1	93.1%
8411	Gas turbines	8.1	6.9	85.4%
3004	Medicaments packaged for retail sale	5.0	3.8	76.2%
7113	Jewelry of precious metal	4.0	3.4	87.8%
8541	Semi-conductor devices	3.8	3.3	88.3%
8525	Transmission apparatus including radio and television	6.6	2.7	40.3%
8517	Electrical apparatus for line telephony or telegraphy	8.1	2.6	32.3%
6204	Women's girls' suits, jackets, dresses, skirts, trousers and shorts	7.7	2.4	31.4%
2934	Other heterocyclic compounds	2.5	2.1	85.1%
8504	Electric transformers and static conductors	6.0	2.1	34.4%
	Exports			
8542	Electronic integrated circuits and microassemblies	26.1	22.3	85.5%
8471	Computers (automatic data process machines; magnetic reader, etc.)	23.1	17.5	75.7%
8473	Parts and accessories for office machinery and computers	19.0	16.7	87.9%
8803	Parts for aircraft and spacecraft	13.0	10.8	82.5%
8411	Gas turbines	11.1	8.2	73.4%
9018	Medical, surgical, dental or veterinary instruments	7.6	6.0	79.5%
8517	Electrical apparatus for line telephony or telegraphy	7.1	5.5	76.7%
8479	Machinery not elsewhere specified	8.0	5.3	65.3%
8525	Transmission apparatus including radio and television	6.5	5.1	78.6%
7108	Gold	5.1	4.9	95.1%
9030	Oscilloscopes, instruments for measuring rays	4.2	3.7	88.5%
8529	Aerials and other radio and TV parts	4.8	3.5	74.5%
8524	Records, tapes and compact discs	3.8	2.9	77.3%
8541	Semi-conductor devices	3.0	2.4	81.3%
9021	Instruments for physical or chemical analysis; instruments for measuring heat, sound or light	2.7	2.4	88.1%

Source: "Quick List" of TRADSTAT product codes, September, 1990; U.S. Imports of Merchandise CO, and U.S. Export of Merchandise CO, U.S. Bureau of the Census 1997; following Henry McFarland, "The Economic Importance of the Air-Cargo Air Carriers," Economist Inc., mimeo, July 2, 1998, excerpted from Tables 2 and 3.
Note: Data on all exports include exports of previously imported goods.

Attachment 1

This attachment sketches the derivation of the formula used above to help arrive at some sense of the likely magnitude of the increase in the prices of air cargo transport services that would be caused by activation of CRAF stage III. The formula is for a textbook case of a purely competitive market perturbed by an action (presumed to be taken by the government) that reduces the supply available to non-government buyers. The stringent caveats required in applying the formula to CRAF and the air cargo markets in the US are indicated in the main text and not repeated here.

The figure below illustrates the model employed. The demand curve D and the supply curve S are consistent with market equilibrium quantity q* and price P*. The effect of CRAF is represented in the model by a uniform downward shift of the supply curve by an amount ΔG (the amount of the commodity that the government diverts to meet its requirements.) The government action results in a decrease Δq* in the amount consumed by non-government buyers and an increase ΔP* in price.



Equilibrium Price and Quantity in a Perfectly Competitive Market Perturbed by an Exogenous Reduction in Supply

Formally, quantity demanded per unit time (q^d) and quantity supplied per unit time (q^s) are given by:

$$q^d = D(P,Z) \quad , \tag{1}$$

$$q^s = S(P,W) - G \quad ,$$

where P is market price, Z and W are vectors of exogenous variable effecting, respectively, demand and supply, and G is the amount taken by the government. Market equilibrium requires the equality of quantity demanded and quantity supplied, or:

$$D(P^*,Z) - [S(P^*,W) - G] = 0. \qquad (2)$$

Totally differentiate equation (2) with respect to G holding Z and W constant:

$$\frac{\partial D}{\partial P^*}\frac{dP^*}{dG} - \frac{\partial S}{\partial P^*}\frac{dP^*}{dG} = -1 \quad ; \qquad (3a)$$

$$\left(\frac{\partial D}{\partial P^*} - \frac{\partial S}{\partial P^*}\right)\frac{dP^*}{dG} = -1 \quad . \qquad (3b)$$

Multiply and divide equation (3b) by P*/q* and note that the elasticity of demand and the elasticity of supply, respectively, are defined as:

$$e_d \equiv \frac{P}{q}\frac{\partial D}{\partial P} \quad , \qquad e_s \equiv \frac{P}{q}\frac{\partial S}{\partial P} \quad .$$

Equation (3b) then gives:

$$\frac{q^*}{P^*}(e_d - e_s)\frac{dP^*}{dG} = -1 \quad ; \qquad \text{or} \qquad (4a)$$

$$\frac{dP^*}{P^*} = -(e_d - e_s)^{-1}\frac{dG}{q^*} \quad . \qquad (4b)$$

The text used the approximate form:

$$\frac{\Delta P^*}{P^*} \cong -(e_d - e_s)^{-1}\frac{\Delta G}{q^*} \quad . \qquad (4c)$$

Results derived from equation (4c) will be inaccurate to the extent that there are strong non-linearities in either the demand or supply functions, and the amount of supply taken by the government is large relative to total supply.

Appendix F

A COMPETITIVE BIDDING FRAMEWORK

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A. PROCEDURES

The following constitute the procedures for instituting a competitive bidding framework for the CRAF program:

- The US Government sets number of aircraft (or number of quality-adjusted MPM/D or MTM/D) to be obtained for Stages I, II, and III of CRAF.
- The US Government pledges to call (as much as is militarily feasible) all aircraft from Stage I, then all aircraft from Stage II, and then all aircraft from Stage III, in the order of their selection as indicated below.
- Any qualified operator can bid any qualified aircraft for any stage. No aircraft can be selected more than once.
- Operators bid specific aircraft at specific wartime rates for Stages I, II, and III.
- The government selects from lowest cost to highest cost per quality-adjusted MPM/D or MTM/D, filling up Stage I. Selected aircraft are not eligible for further consideration.
- The government selects from lowest cost to highest cost per quality-adjusted MPM/D or MTM/D, filling up Stage II. Selected aircraft are not eligible for further consideration.
- The government selects from lowest cost to highest cost per quality-adjusted MPM/D or MTM/D, filling up Stage III.

B. ADDITIONAL RULES

Participation in the GSA city-pairs program, and participation in the DoD peacetime passenger and cargo business, will be contingent on having specified minimum threshold percentages of the qualified bidders' aircraft selected. These minimum percentages may be different for different types of business.

The government also may impose maximum thresholds to prevent selected types of operators from being too heavily committed to the government in wartime.

C. EXPECTED BEHAVIOR

It is expected that charter operators will bid for Stages I, II, and III in that order and at lower costs than airlines and integrators.

It is expected that airlines and integrators will not wish to be activated and will wish to be selected for Stage II. They will bid for Stage III, II, and I, in that order and at higher costs than the charters.

If there are not enough bidders for Stages I and II, the government may wish to take action. Two options would be:

- The government could weight the aircraft by stage in achieving the minimum percentages for eligibility for government business. For instance, it could weight aircraft selected for Stage I by III, aircraft selected for Stage II by II, and aircraft selected for Stage III by I.
- The government could combine the stages into one stage of passenger and one stage of cargo aircraft. It could select the aircraft one-by-one and pledge to call-up aircraft in that order.

D. DISCUSSION OF PROCEDURES

The wartime costs of airlift supplied by CRAF in the above procedure do not appear in the DoD budget.

Wartime costs of airlines and integrators can be bid high enough to offset expected business losses. This, combined with peacetime incentives, should assure that there are sufficient numbers of bidders.

The wartime costs of the slate of successful bidders could be very high if the charters were not present in large numbers. This will be, to some extent, a function of the DoD peacetime buy in categories served by charters. If the government buys more C-17s, there will be reduced business for charter airlines and thus fewer qualified bidders who would normally be interested in serving Stages I and II.

If the government buys more C-17s, the probabilities of activation may be assessed by the airlines and integrators to be lower and thus they may be more willing to bid for Stages I and II. Or, if the government goes to one stage, they may be motivated to bid sufficient aircraft to fill the program.

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14. ABSTRACT

This report describes four broad initiatives needed for managing and employing the Civil Reserve Air Fleet (CRAF) over the next decade. CRAF airlines have provided essential support to the US military since the Korean War. Today, CRAF airlines are supporting Operation Iraqi Freedom, and are committing nearly double the amount of commercial aircraft required by DoD for its most demanding war plans. Over the coming decade, the Defense Department's management and employment of CRAF will need to adapt to meet a number of significant challenges. The airline industry is facing unprecedented financial losses, and will undergo significant restructuring; at the same time, developments in the global security environment, as well as the Department's aircraft purchases and transformational initiatives, will reshape their employment of the fleet. But, if DoD takes the appropriate steps, it can continue to rely on adequate support from US airlines for military operations through the remainder of this decade, and beyond.

15. SUBJECT TERMS

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